Machine and Tool

BLUE BOOK

ESTABLISHED 1906

FEBRUARY 1954

Split Dimensioning and the Use of Templates

Continuous Milling of Squares

Abrasive Action in Surface Grinding

Last Minute Washington News

Letters to the Editor

CONTENTS ON PAGE 5

New Honeycomb Processing Method

Abrasive Action in Surface Grinding

. . . *but*

Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

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MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

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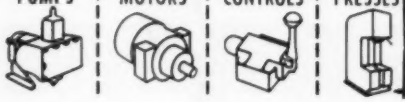

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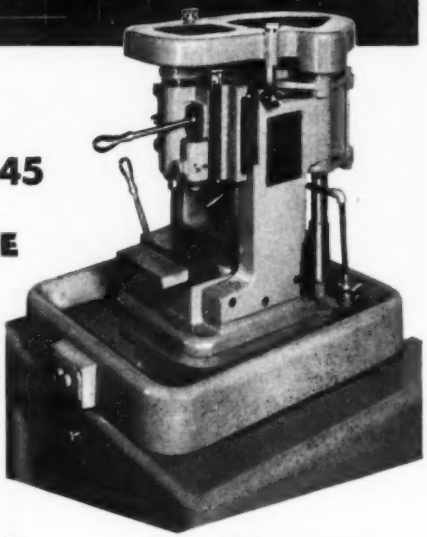

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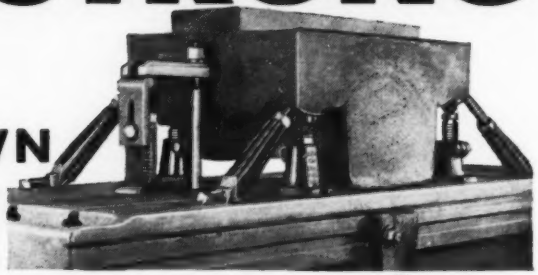

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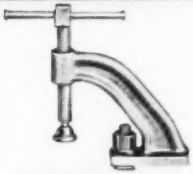

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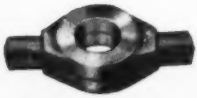

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Hitchcock Managers are Listed on Page 64

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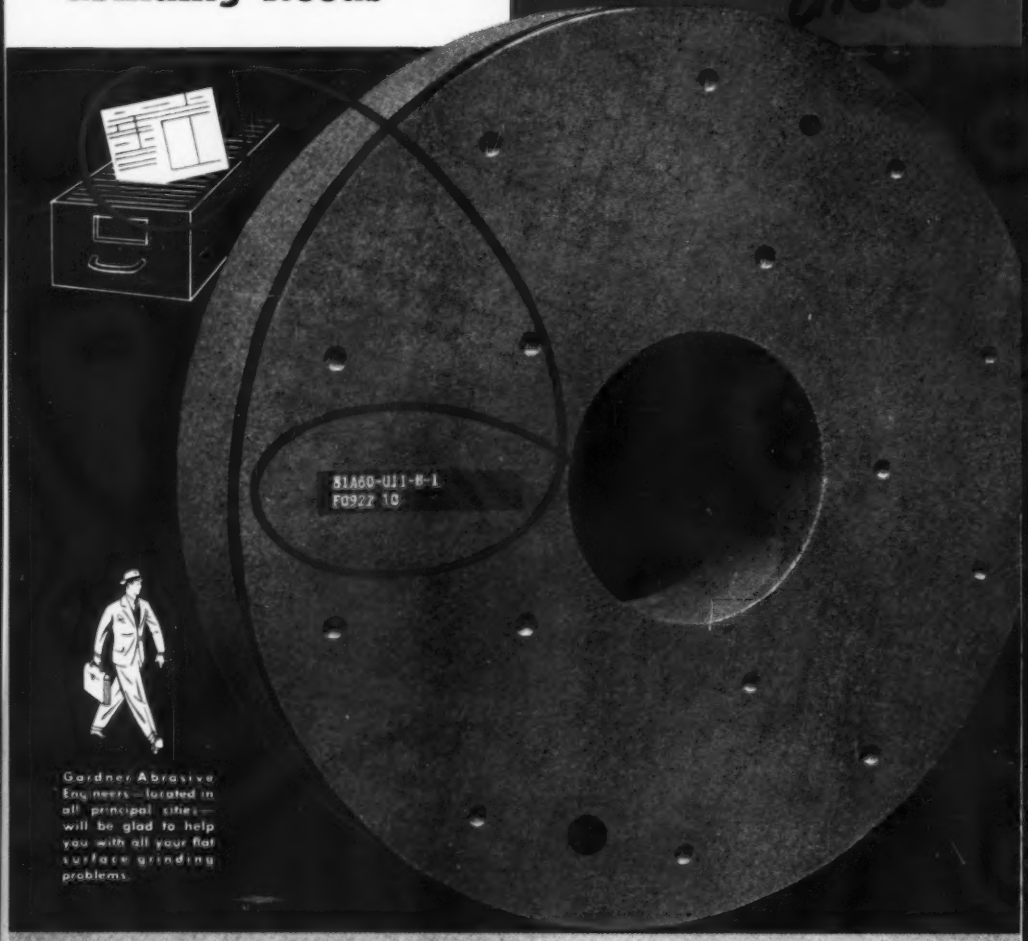

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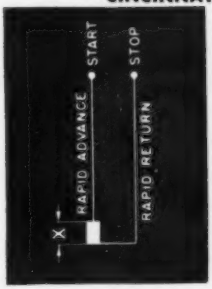
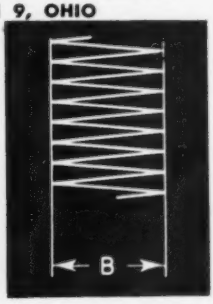
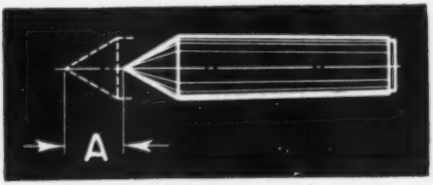
Subsidiary of The Cincinnati Milling Machine Co.
CINCINNATI 9, OHIO



AUTOMATIC INFEED
X = Stock removal, adjustable from 0 to .030".



AUTOMATIC SPINDLE RECIPROCATION
B = Stroke, adjustable from 1/32" to 3/16".



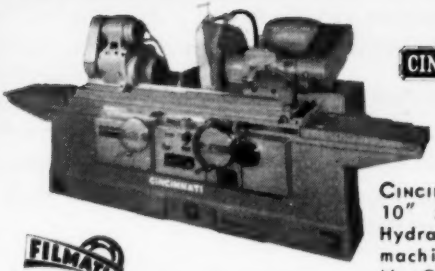
HYDRAULIC FOOTSTOCK **A = Automatic advance and retraction of footstock spindle.**

CINCINNATI FILMATIC

10" PLAIN

HYDRAULIC GRINDER

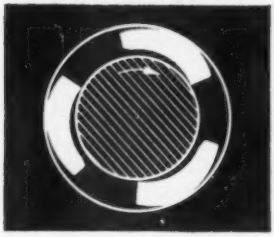
AUTOMATIC COOLANT AND HEADSTOCK CONTROL
Work rotation and coolant automatically start and stop. Standard feature.



CINCINNATI

FILMATIC

CINCINNATI FILMATIC 10" x 36" Plain Hydraulic Grinding machine. Catalog No. G-603.



FILMATIC GRINDING WHEEL SPINDLE BEARINGS
Automatically adjust themselves for amount and direction of load.

CINCINNATI

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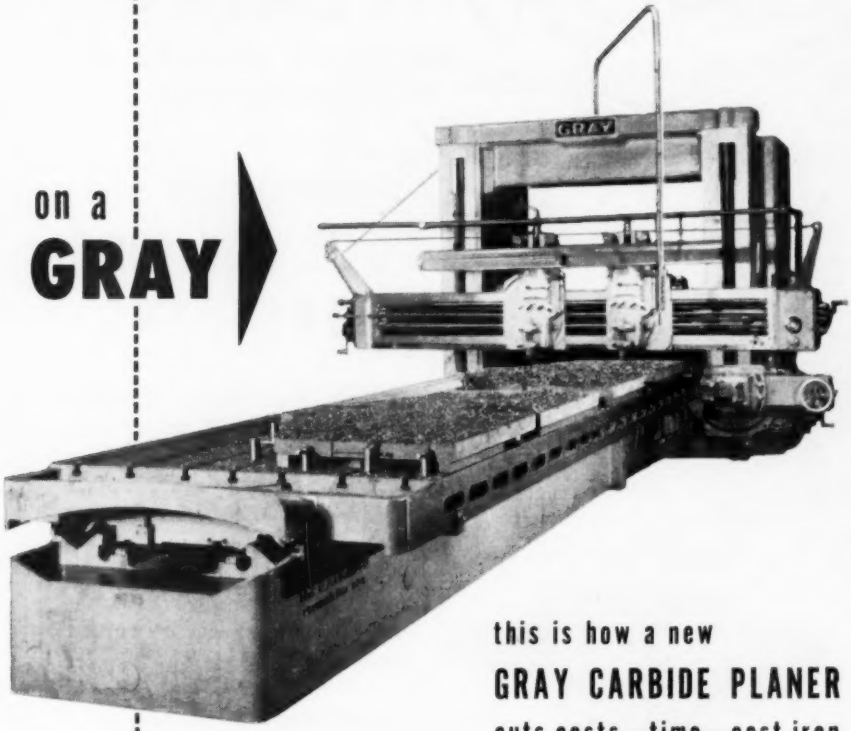

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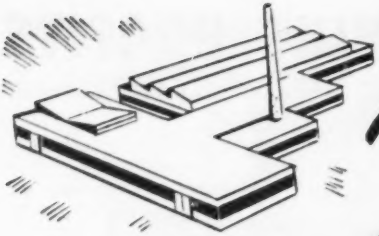

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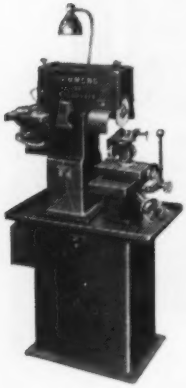

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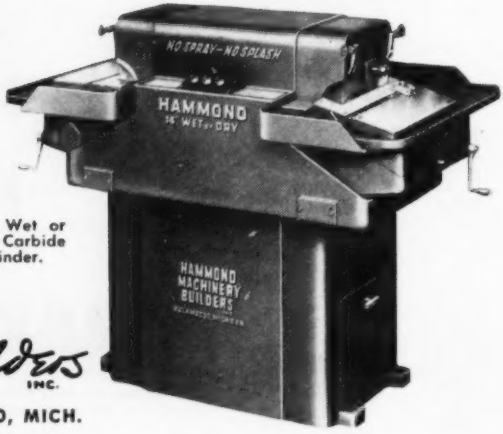

14-WD Wet or Dry 14" Carbide Tool Grinder.

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HIGH SPEED MOLYBDENUM — the RED Blade for cutting mild alloy steels and general purpose use.

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HIGH SPEED WELD-EDGE — the SHATTERPROOF Blade for use where maximum safety is required.

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Standard (illustrated) and tension types; shank lengths to 15".

Hex Drives:	1/4"	5/16"	7/16"	5/8"
for Hex nuts:	1/4" to 9/16"	1/4" to 3/4"	1/4" to 1 1/16"	9/16" to 1 1/4"
for Square nuts:	1/4" to 7/16"		1/4" to 13/16"	9/16" to 15/16"

Standard and tension (illustrated) types; shank lengths to 15".

Square Drives:	3/8"	1/2"	5/8"
for Hex nuts:	1/4" to 3/4"	1/4" to 1 1/4"	9/16" to 1 1/4"
for Square nuts:	1/4" to 5/8"	1/4" to 13/16"	9/16" to 15/16"

When *your* nut running operations call for impact extension universal wrenches, choose yours from the 3,910 types and sizes offered by Apex.

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You'll save production time—Tension type wrenches have sleeve-enclosed spring which holds socket firmly in straight or angular position. Ends awkward hand-positioning of sockets in those hard-to-reach spots.

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There's an Apex impact extension universal wrench exactly fitted to *your* nut running job—write, on your company letterhead please, for Catalog 29, in which you'll find thousands of Apex impact sockets, extensions and adapters for every nut running operation.

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CHEE, BOSS, WHERE'LL I PUT MY LUNCH, MAGAZINES, GYM SHOES, HAT AND COAT IF I USE THEM CABINETS FOR TOOLS?
THE BOSS SHOUL COME BY LAST WE WHEN LATHEDOC WUZ KEEPIN' WH MICE IN THEM CABINET BASE
TRAV-TOP C'INTILATHE

center on . . .

cincinnati

J.R.WILLIAMS
YEAH! THEY SQUEAKED SO LOUD LATHEDOG THOUGHT IT WUZ THE LEAD SCREW AND KEPT USIN' THE OIL SHOT PLUNGER!
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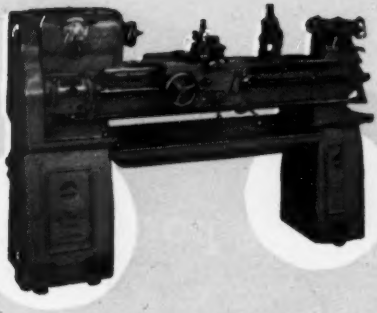
TRASH
by NEA Service, Inc.

Large size prints of this J. R. Williams cartoon are available for framing.



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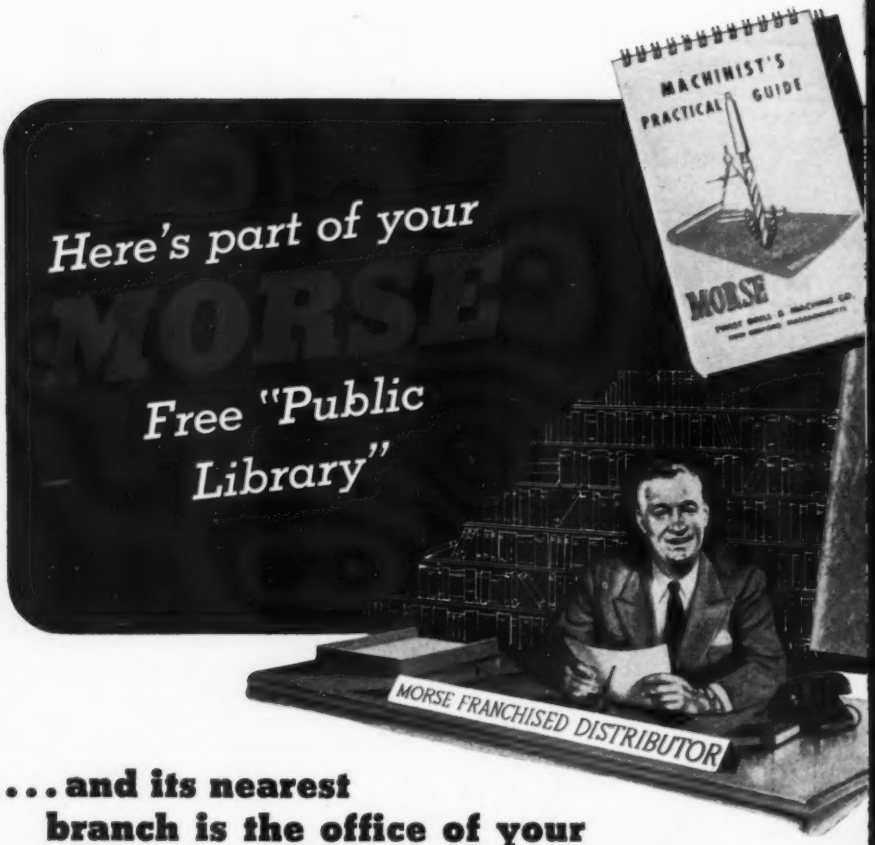

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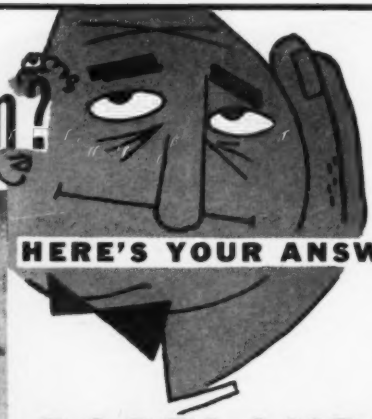

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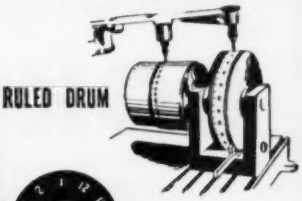

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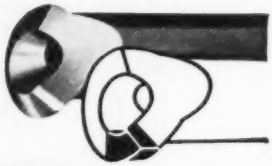

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for general boring

STYLE B
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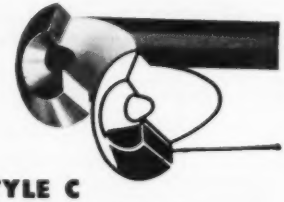

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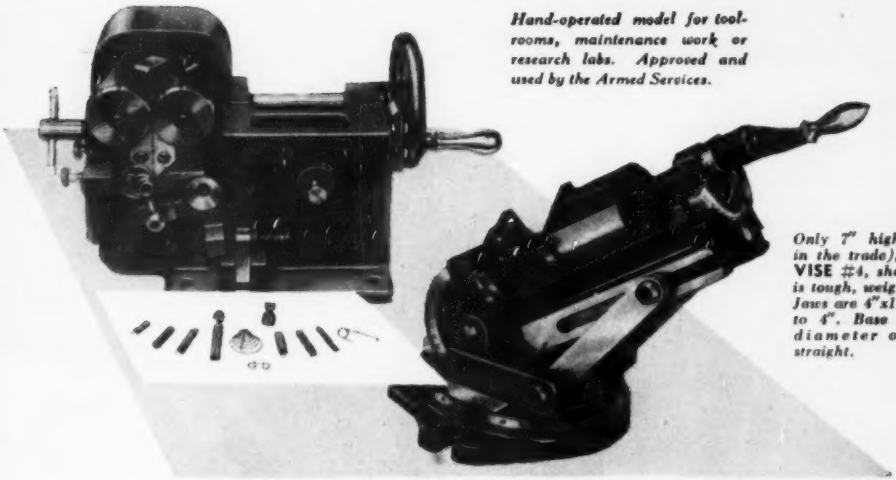

Hand-operated model for toolrooms, maintenance work or research labs. Approved and used by the Armed Services.

Only 7" high (lowest in the trade), **OMNI-VISE** *#4, shown here, is tough, weighs 74 lbs. Jaws are 4"x1½", open to 4". Base is 9" in diameter one side straight.*

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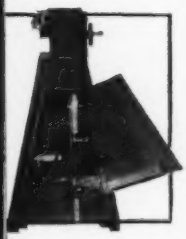
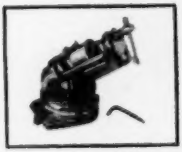


Power model for continuous runs, on welded steel console base.



Accurately set in all three planes in only 15 seconds, this sturdy precision vise made in two capacities saves time and headaches for progressive shop operators and pays for itself quickly. Only 7" high (lowest in the trade), **OMNI-VISE** #4, shown at top, is tough, weighs 74 lbs. Jaws are 4" x 1½", open to 4". Base is 9" in diameter with one side straight. Inset shows **OMNI-VISE** #2, a precision low-priced vise. Users find it exceptional for grinding compound angles on carbide tools. Weight, 16 lbs. Height, 4¾". Jaws, 2⅛". Opening, 2⅛". Base, 7¼" x 5". For grinding, drilling or general work at any angle, by hand or machine, an **OMNI-VISE** is the machinist's choice.

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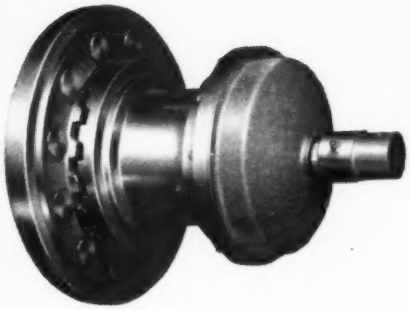

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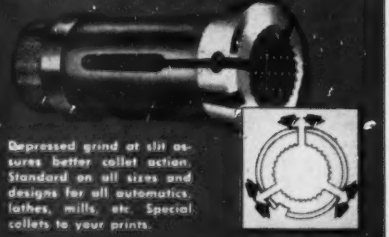

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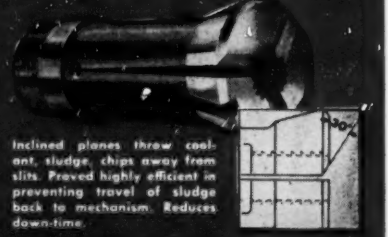

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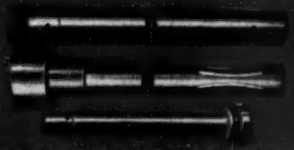

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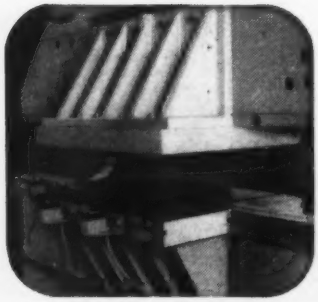
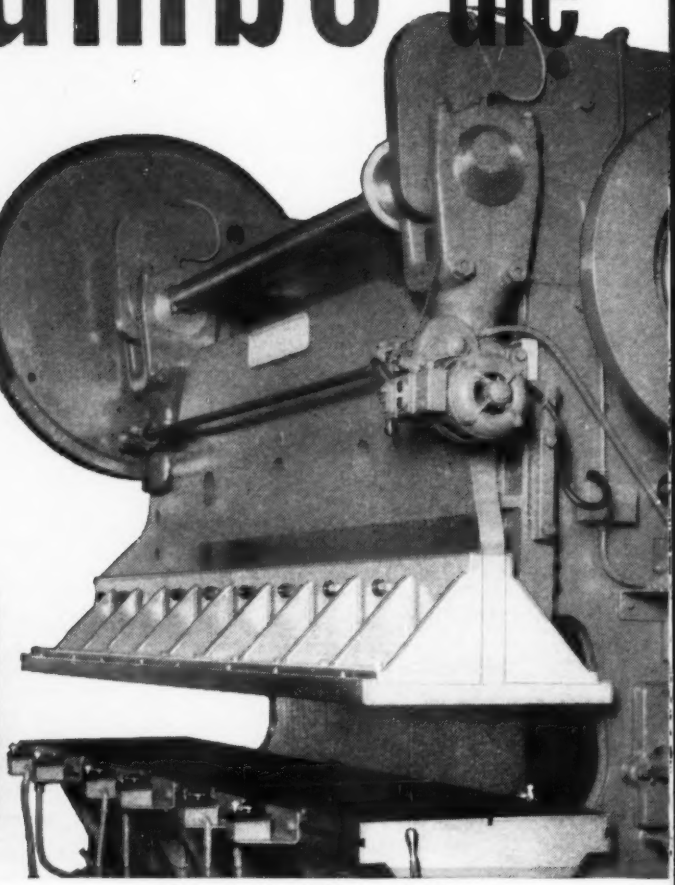


• Short, special purpose, removable upper brackets.



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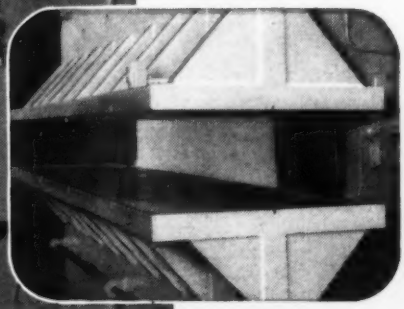

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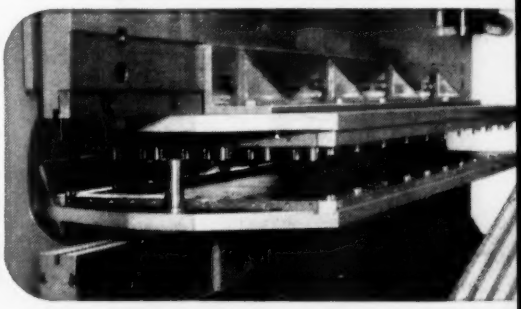
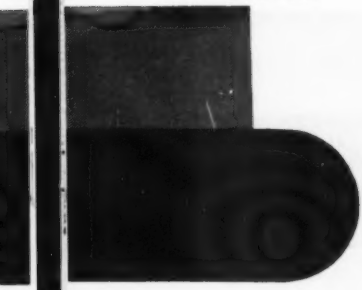


• Large area, removable upper and lower brackets.



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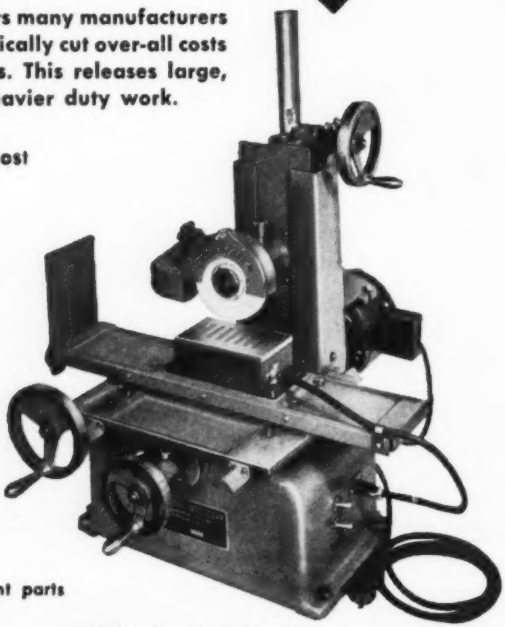

SPECIFICATIONS—4" traverse —8" longitudinal—6" vertical under 4" wheel. Approximate weight 160 lbs.

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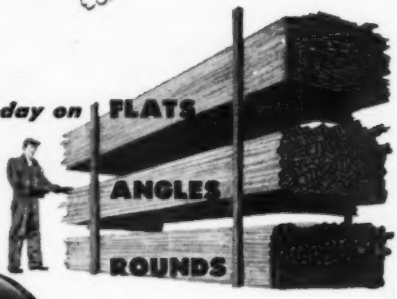

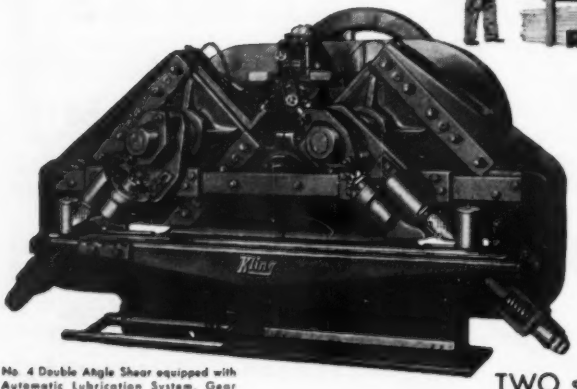

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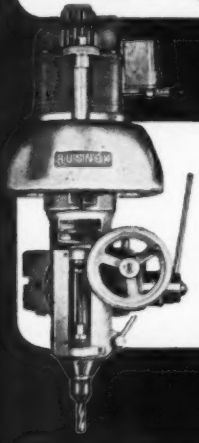
¾" end mill capacity.
For vertical, horizontal and angular operations.



1 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
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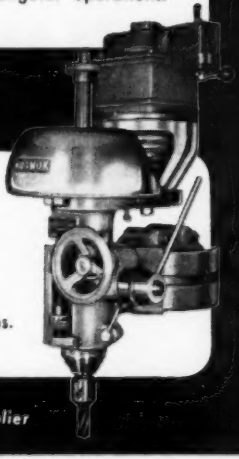
For vertical, horizontal and angular operations.



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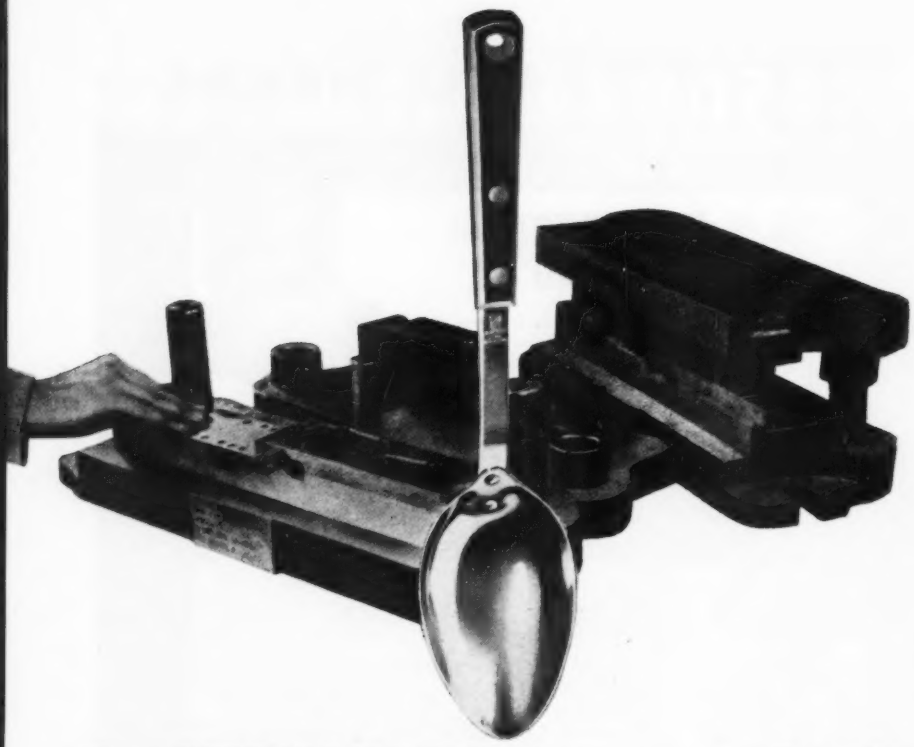

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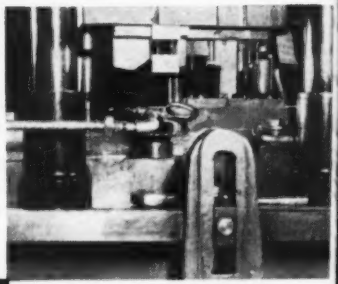

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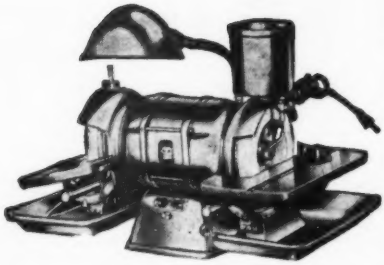
***DAYTON**	7	3196 Delphos Ave.
***DETROIT**	16	1549 Temple Ave.
***GRAND RAPIDS**		113 Michigan St., N.W.
INDIANAPOLIS	4	5 West 10th St.
***LONG ISLAND CITY**		47-28 37th St.
***LOS ANGELES**	54	Ducommun Metals & Supply Co., 4890 South Alameda
MILWAUKEE	2	111 E. Wisconsin Ave.
***PHILADELPHIA**	40	511 W. Courtland St.
***ROCHESTER**	6	33 Rutter St.

**Indicates complete stock*

DANLY

DIE SETS . . . STANDARD OR SPECIAL
DIEMAKERS SUPPLIES

DANLY MACHINE SPECIALTIES, IN
2100 South Laramie Avenue
Chicago 50, Illinois



Special grinder
FOR CARBIDE TOOLS

BALDOR Grinder No. 500—built especially for sharpening carbide tools quickly and accurately. Reversible ½ h.p. capacitor type motor, 3450 rpm; heavy shaft, large ball-bearings. Dynamically balanced armature. Motor withstands repeated overloads. Protractor at each end of grinder. Complete as shown at left ... **$149.20**

Baldor

balanced

HEAVY DUTY

BALL-BEARING GRINDERS

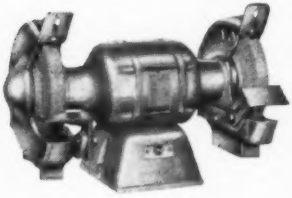
BENCH and PEDESTAL TYPES
TOTALLY ENCLOSED MOTORS
BEARINGS LUBRICATED FOR LIFE

BALDOR Grinders are built for heavy duty, precision grinding in shops and factories. The motors (built by BALDOR) are totally enclosed, splash-proof and protected from dirt, grit and metal particles.

Wheels and rotors are accurately balanced to avoid vibration. The ball-bearings are lubricated for life.

The BALDOR line of grinders includes both bench and pedestal types—with 6" to 12" wheels. Each grinder is fully guaranteed.

Complete details and prices in Bulletin 321-H



★ ASK FOR BULLETIN 321-H

BALDOR ELECTRIC CO.
4368 Duncan Ave.
ST. LOUIS 10, MO.

WHAT DOES FIRTH STERLING OFFER YOU?

(ANSWER NUMBER 4)

RESEARCH THAT ANTICIPATES TOMORROW'S NEEDS

Our objective is to help *you* solve the technical and metallurgical problems of an *atomic* age *before* they arise . . . not *after*. So, at Firth Sterling, constant emphasis is on full-scale research, development, and production in specialty steels, carbides, new metals, and new methods.

Out of this determination to be ahead, not just abreast of need, has come this amazing three year record of achievement in *your* interest:

- A method of heat tinting that makes *Color Metallography*

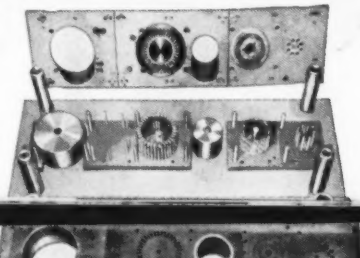
A VERSATILE FAMILY OF *Tool and Die Steels*

CROMOVAN • AIRVAN • INVARO

Certain steels or families of steel stand out as having almost universal application for general use, ranging from moderate to high production as job requirements demand. One such Firth Sterling family of steels consists of CROMOVAN, AIRVAN, and INVARO. CROMOVAN and AIRVAN are air hardening; INVARO is oil hardening.

ANALYSES

	CROMOVAN	AIRVAN	INVARO
Carbon	1.60%	1.00%	.90%
Chromium	12.50%	5.25%	.50%
Vanadium	1.00%	.25%	.20%
Molybdenum	1.00%	1.15%	—
Manganese	—	—	1.15%
Tungsten	—	—	.50%



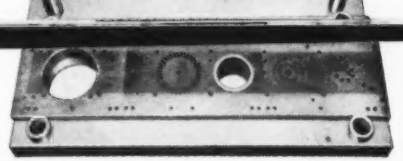
- A method of heat tinting that makes *Color Metallography* [illegible]

- New metals of great present and future potential that include heavy metal, three grades of chromium carbide, titanium carbide, and high temperature alloys.
- Cermets—those amazing hybrids of ceramic and metal, possessing in *combination* the best characteristics of each, to overcome modern technological problems.
- Zirconium—in ingot, billet, bar, rod, strip, sheet, wire, and tubing form—soon to be available for industrial applications.
- A new chemical plant, employing the most advanced processes and equipment, producing ammonium paratungstate of the highest *purity* to improve the quality of our tungsten carbides.
- Method "X"—an electro-mechanical process for machining metals that are unmachinable by conventional means.

Yes, all these are the result of "accent on research" . . . the justification for our statement

Firth Sterling Stands for Metallurgical Achievement—Past, Present, Future

*Write for reprint of article from Oct. 19, 1953 issue of STEEL.



Generally speaking, CROMOVAN is intended for long production runs where hundreds of thousands or millions of pieces must be produced at minimum cost; AIRVAN for intermediate runs where toughness and high abrasion resistance are also requirements; INVARO, an oil hardening tool steel for all other general use.

Full technical details are available in these free bulletins. Write for them today or ask your Firth Sterling representative to call and discuss your tool and die needs . . . steel *or* carbide.

P-1

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

OFFICES* AND WAREHOUSES: BIRMINGHAM* CHICAGO CLEVELAND DAYTON* DETROIT HARTFORD HOUSTON* LOS ANGELES NEW YORK* PHILADELPHIA* PITTSBURGH* WASHINGTON* WESTFIELD, N.J.*

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys

Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets

ACCURATE AT ANY ANGLE

TREE

UNIVERSAL MILLING HEAD

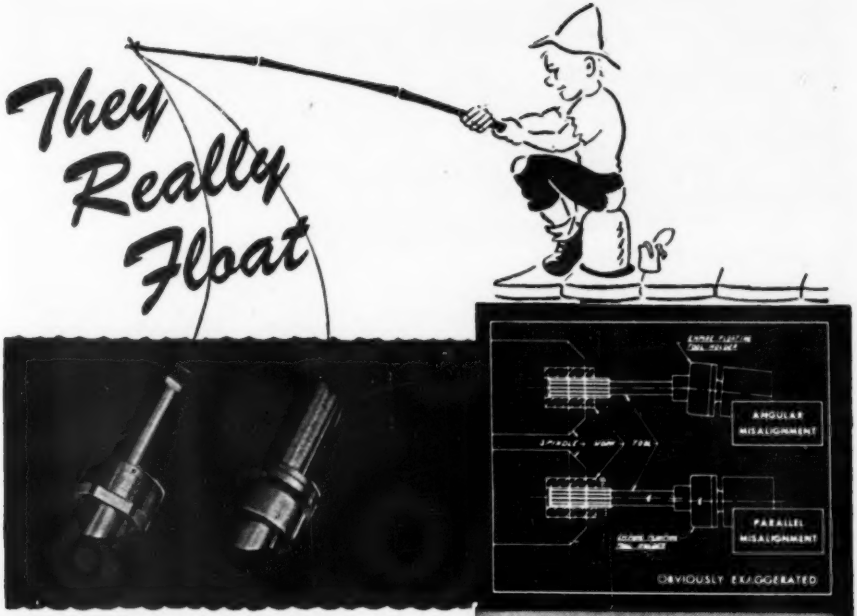
Rugged, compact design and precision manufacturing combine to make the TREE Universal Milling Attachment accurate for milling, drilling or boring . . . **at any angle.** Heavy duty spindle enables ¾" collet capacity. Automatic collet closer. Power feed. Eight spindle speeds. Hardened and ground spindle and quill. Enclosed micrometer depth stop.

Write for free literature describing the MH-4 Milling Head illustrated, the TREE Taper Boring Tool, the 2UV Vertical Mill and other quality TREE Tools. . .

EXPORT ADDRESS: States Trading Co., 401 Brdwy., New York 13, Cable Address; "STRADESO"

TREE TOOL AND DIE WORKS
1600 JUNCTION AVENUE **RACINE, WISCONSIN**

They Really Float



EMPIRE FLOATING REAMER HOLDERS *and* EMPIRE FLOATING TAP HOLDERS

And we do mean float! These floating reamer and tap holders compensate for both out-of-parallel and angular misalignment and permit tap or reamer to float freely—in and out—and will not freeze under tension caused by drag.

By referring to the drawing you will note that the sleeve and shank float independently of each other—achieving a free and easy movement—a unique engineering design not found in any other floating tool.

With the Empire Floating Tool Holder you'll have no more bell mouths or over-sized holes. Holes can be reamed to close tolerances.

Ask about the Floating-Releasing Tap Holder

—that corrects for both parallel and angular misalignment

—that will not strip threads when tap is pulled out

—that permits adjustments of float to threading—right or left hand.

EMPIRE TOOL COMPANY

8774 GRINNELL AVE. DETROIT 13, MICHIGAN

Chicago RIVET "912"

AUTOMATIC RIVET SETTER CUTS COSTS 3 WAYS

1 FASTENS FASTER . . .
Only the speed of the operator limits the 912's riveting speed. Completely automatic. A push on the foot pedal automatically feeds, inserts and clinches the rivet.

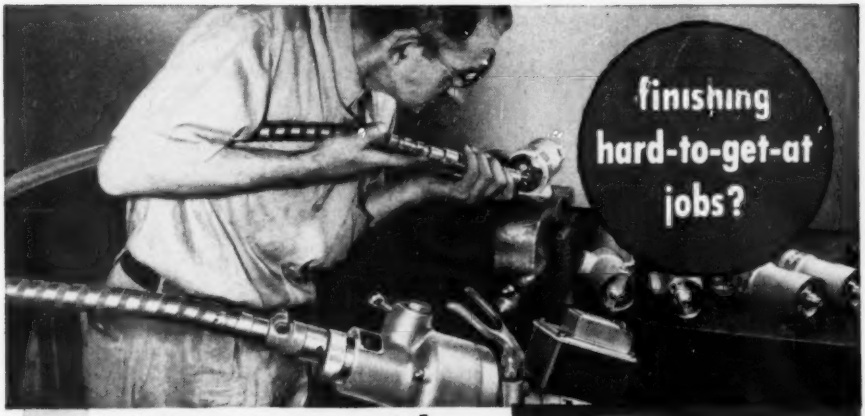
2 DOES WORK OF SEVERAL MACHINES
Quick change rotary hopper and raceway makes the 912 adjustable in 5 to 10 minutes to set different size rivets. Adjustable anvil height and 12-inch throat provide further versatility.

3 SAVES ON MAINTENANCE . . .
The 912 is massively built to stand the shocks of constant use and is designed for quick, easy servicing and parts replacement.

If your assembly calls for 3/16" steel tubular rivets or smaller, of 15/16" lengths or less, ask us to show you how the 912 can cut your fastening costs. Send a sample of your problem assembly (or blueprint) for a free fastening analysis.

FREE CATALOG
contains valuable engineering information and rivet specifications plus illustrated descriptions of 26 Chicago Automatic Rivet Setters.

Chicago Rivet & MACHINE CO.
9610 West Jackson Boulevard, Bellwood (Chicago Suburb) Illinois
***Branch Factory:* Tyrone, Pa.**



it's a snap with a

Strand

FLEXIBLE SHAFT MACHINE

No heavy, bulky motor to handle! You'll have positive control of the operation because you hold only the handpiece, not the heavy, bulky motor. Less operator fatigue, higher production, fewer rejects.

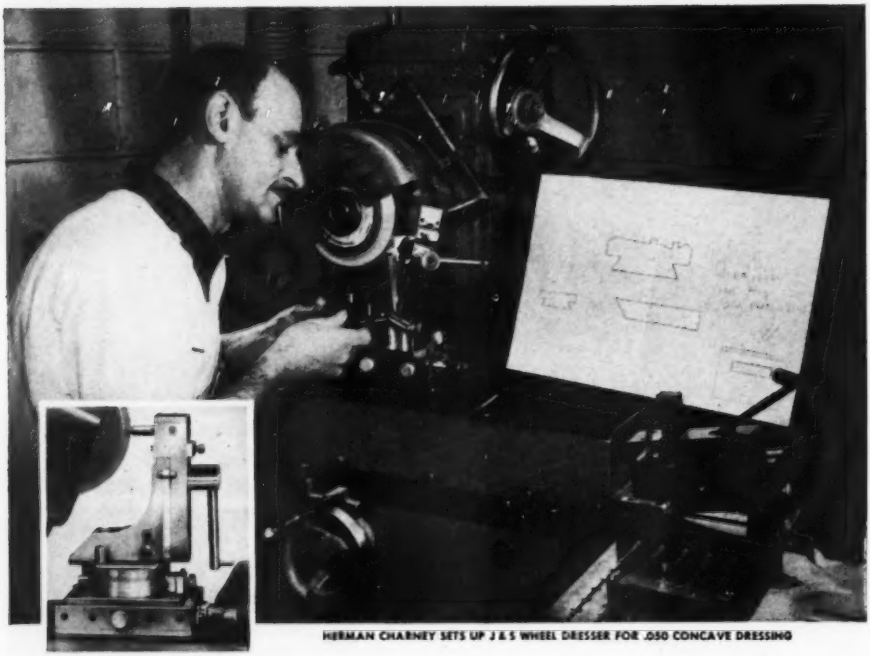
Wide range of uses! Grind, Rotary File, Brush or Drill merely by changing the tool. And with the new Strand Quick Change Handpiece you can change tools in seconds without using wrenches, tools or special equipment. Simple press-type locking button does the trick!

Wide range of speeds! Best of all you get a choice of two four-speed ranges or two five-speed ranges when you use a *Strandflex* machine. Speeds range from 850 to 12,000 R.P.M. Change speeds without changing pulleys or drive belts by the patented Strand Gear Drive unit standard on all *Strandflex* machines. And, for an even wider range of speeds you can use the sensational new Strand High Speed Handpiece that actually triples spindle speeds! *Lets you work at up to 27,000 R.P.M.'s for high speed steel or carbide cutters.*

GET THE FULL STORY NOW! Write for Catalog 231-A or see your dealer for information. Full Strand line includes direct drive and countershaft machines up to 3 HP and Strandflex units up to 1 HP. Also complete line of accessories and attachments.

FRANKLIN BALMAR CORPORATION

N. A. STRAND DIVISION
Woodberry, Baltimore 11, Md.
5001 N. Wolcott Ave., Chicago 40, Ill.



HERMAN CHARNEY SETS UP J & S WHEEL DRESSER FOR .050 CONCAVE DRESSING

Saves hours by setting angles in seconds, radii in minutes

A typical job made easier with a J & S "Fluidmotion" Wheel Dresser

Here's a wheel dressing job which calls for 13 angles, 4 radii, 7 flats. Ordinarily you might expect to spend from 5 to 30 minutes for each setting. With a J & S "Fluidmotion" Wheel Dresser, tool grinder Herman Charney made *all* 24 settings in just 21 minutes.

Time-saving Features

An unusual case? No — it's typical of the speed and ease of operating a J & S Wheel Dresser. Setting 2 angles with a "Fluidmotion" Dresser, for example, takes only 10 seconds. Setting a radius takes only 2-3 minutes.

Note just *how* easy it is to operate a J & S Wheel Dresser. All you need is a micrometer and a simple hex wrench. You can forget about gage blocks, height gages and master gage settings. No need to bother either with parallel bars, surface plates or dial indicators.

With the "Fluidmotion" Dresser, you can also dress two angles tangent to a radius in one continuous motion. After dressing the angles, the diamond automatically returns to center.

Accurate to 0.0001"

Accuracy? You can make concave and convex contours at a full 180 degrees with a guaranteed accuracy of 0.0001". J & S dressed forms, too, are always clean and precise. Angles and radii *flow* into each other, free of tool or chatter marks.

These are some of the benefits you get when you use a J & S "Fluidmotion" Wheel Dresser. A variety of models are available for dressing wheels up to 24" in diameter. Construction in all cases is of high-carbon, high-chrome steels.

Write for complete information today

J&S TOOL CO., INC.

WHEEL DRESSERS • JAW CLAMPS • PRECISION VISES • SINE BARS • DOWN-HOLDING DEVICES

647 W. MT. PLEASANT AVENUE, LIVINGSTON, NEW JERSEY

Establish Highest Efficiency
In *Your* Toolroom With Easy-to-Operate

OLIVER ACE

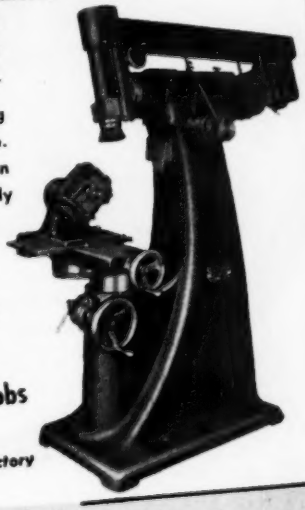
Universal Tool and Cutter Grinders

Get
- Precision
- Speed
- Economy

For dependability and ease of operation, the Oliver ACE is especially qualified in the grinding of tungsten-carbide and high speed milling cutters and tools. Extremely accurate, it has only one sliding part with ample bearing, efficiently protected from dust.

The Oliver Ace IS *Universal*—it handles a wider range of cutters than the ordinary cutter grinder—and all this with only two simple fixtures. Requiring no computation, the direct reading for clearances on the ACE increases the operator's efficiency in grinding the most difficult cutters (no stoop, no squat, no squint).

Nearly 40 years of designing and building lasting toolroom machinery stand behind the Oliver Ace. Easy to set up . . . it also effects economies in floor space and less outlay in dollars for this truly superior type machine. Let OLIVER show you the WAY to speedier, more economical precision tool and cutter grinding.



Direct Reading for Clearance
—Reduces Fatigue
—Eases Operators' Jobs

See our Catalog in Sweet's Directory

Priced to meet your budget, the ACE excels for grinding face mills up to 15"—also, slab mills • slitting saws • dovetail cutters • angular cutters • double angle cutters • Fellows helical cutters • reamers • taper reamers • production gashing and carbide tipped circular saws.

2 MODELS: Standard and Heavy Duty (illustrated)
Write Today for Complete Data

MACHINE TOOLS by OLIVER include:
AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES

OLIVER INSTRUMENT CO.
1408 E. MAUMEE • ADRIAN, MICHIGAN

AMES

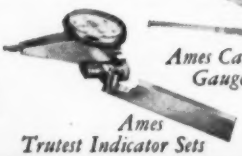
...the preferred

. . . not because they cost more (in the long run they're more economical) but because they're completely impersonal!

Ames Micrometer Dial Gauges and Indicators meet the demand for increasingly critical precision instruments. They are built by exclusive Ames methods and machines, and 100% checked for accuracy. They are extremely sensitive yet ruggedly built to give you *longer* service with *less* down-time.

Ames Long Range Dial Indicator No. 262

Ames Dial Comparator No. 13



Ames Caliper Gauge No. 12B

Ames Dial Micrometer No. 502

Ames Trutest Indicator Sets

Send today for your free copy of Catalog No. 58

Representatives in principal cities.

B. C. AMES CO. *28 Ames Street Waltham 54, Mass.*

Mfgr. of Micrometer Dial Gauges • Micrometer Dial Indicators

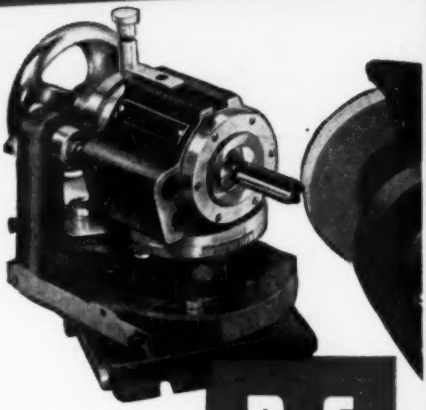
RELIEVES FORM TOOLS • RELIEVES CENTER DRILLS

RELIEVES TAPS • RELIEVES COUNTERBORES • RELIEVES SPHERICAL CUTTERS

RELIEVES PROFILE MILLS • RELIEVES REAMERS • RELIEVES STEP DRILLS

What a relief! ...RADIAL relief!

FOR MORE CUTS PER GRIND and BETTER CUTS — SHARPEN STRAIGHT and SPIRAL TOOLS WITH D • S



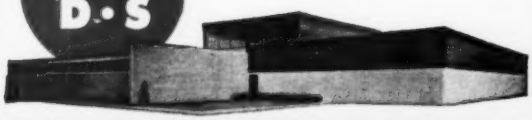
By actual user experience, radially relieved tools have outlasted tools with standard angular relief by as much as 5 times. They cut freer and better. D.S. is readily set up and radial relief can be produced by any good grinder hand without special experience. Hundreds of these fixtures are now in use.

D • S RADIAL RELIEF GRINDER

Any amount of margin, parallel with cutting edge, can be left if desired on either straight or spiral tools.

NEW HOME OF D • S

WRITE FOR OUR CATALOG



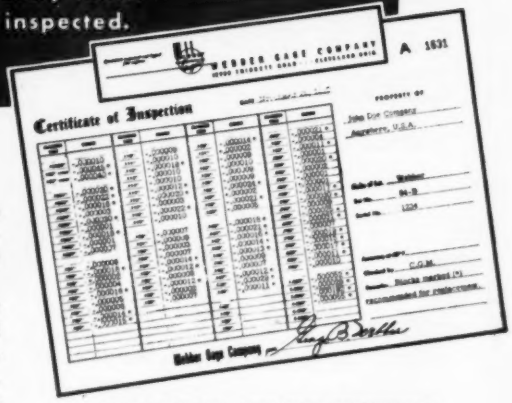
D • S GRINDER DIVISION
Royal Oak Tool & Machine Co.
Stephenson Hyway • Royal Oak, Mich.

RELIEVES BORING BARS • RELIEVES HOLLOW MILLS

Don't invite controversy!

Have your gage blocks inspected periodically

$16.50 for an 84-block set.
Smaller sets proportionately lower
. . . all makes of blocks inspected.



Don't allow wear in gage blocks to cause unexplained difficulties in assembly. When trouble develops start checking the blocks immediately.

If they have been used daily for any long period of time they should be examined just to make sure their accuracy is still within tolerated limits. Better yet send them to us before trouble occurs. You may find that only a few blocks need replacement.

Instead of discarding an entire set, replace those that need replacement and save money in doing so. The set will be returned within 24 hours after it is received with a certificate of inspection, noting the degree of wear of each block. Webber Gage Company, 12905 Triskett Rd., Cleveland 11, Ohio.

INSPECTION SERVICE INCLUDES:

1. Comparison with master blocks certified by the U. S. Bureau of Standards.
2. Removal of burrs and nicks which impair accuracy.
3. Notation of degree of wear of each block.
4. Identification of those blocks that are worn or damaged beyond repair with recommendation for replacement.

WEBBER GAGE COMPANY
12905 Triskett Rd., Cleveland 11, OHIO

Webber

MICRO-ACCURATE GAGE BLOCKS & FIXTURES

LARGEST EXCLUSIVE MANUFACTURERS OF GAGE BLOCKS

National Tool Co.

Years of successful experience in special tooling and related production problems are yours for the asking.

When the job requires special cutting tools, call in your National Tool Co. representative. He is backed by more than 49 years experience in the engineering and manufacture of special cutting tools. His assistance is yours, without obligation, whether you're interested in one tool or a complete tooling program.

National Tool Co.
Cleveland 2, Ohio

eliminate the guesswork in selecting tool steels

Thousands of metal working people are using the Crucible Tool Steel Selector to determine exactly which type of steel they need. This handy selector

applications.

HERE'S AN EXAMPLE:

Application — Deep drawing die for steel

Major Class — Metal Forming — Cold

Sub-Group — Special Purpose

Tool Steel — Airdi 150

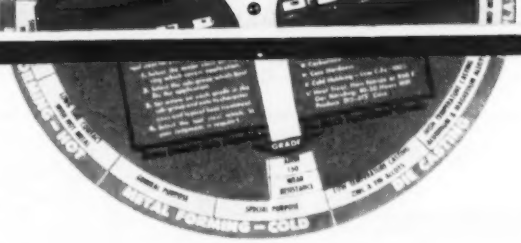
exactly which type of steel they need. This handy selector

applications.

The selector is unique because it starts with the ultimate use of the steel. It breaks down all tool steel applications into six major classifications, under which the different grades of steel available for certain specific requirements are indicated in legible cutouts. Heat treatment and machinability data are also included for each grade.

A flip of the dial will give you the answer, and almost just as quickly you can get the steel you select. For each type of steel shown on the selector is in stock in Crucible warehouses, conveniently located throughout the country.

To get your Selector merely fill in the coupon and mail. There is no obligation whatsoever.



⅓ actual size, Selector is in 3 colors

Tool Steel — Airdi 150

A turn of the dial does it! And you're sure you're right

Crucible Steel Company of America
Dept. MB, Oliver Building
Pittsburgh 22, Pa.

Name_____

Company_____ **Title**_____

Address_____ **City**_____ **State**_____

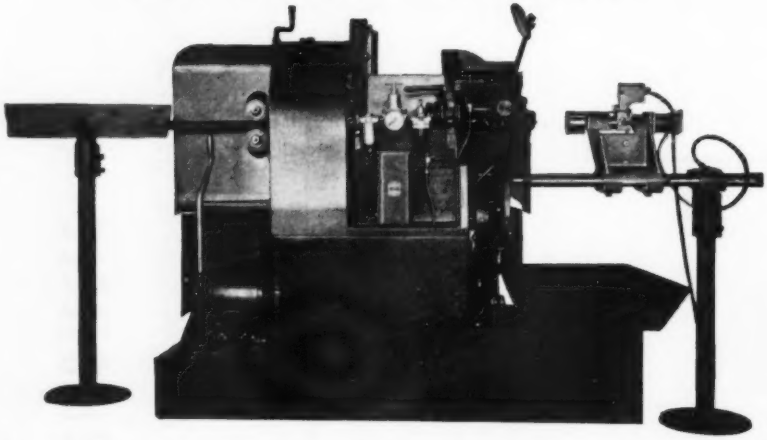
CRUCIBLE first name in special purpose steels

54 *years of* Fine *steelmaking*

TOOL STEELS

CRUCIBLE STEEL COMPANY OF AMERICA · TOOL STEEL SALES · SYRACUSE, N. Y.

The NEW MODERN AUTOMATIC
CUTTING-OFF MACHINE



Cuts Off Tubing Pipe and Shafting . . . FAST

Cuts off longer pieces than a regular automatic machine. In fact, cuts off *any length you want*—and cuts it *faster*. If your production requires quantity cutting-off of tubing, pipe or shafting, check the figures below against your present time.

½" Tubing

This machine cuts off and chamfers both outside edges of ½" .030 wall tubing, 5" long at the rate of one every 2.5 seconds.

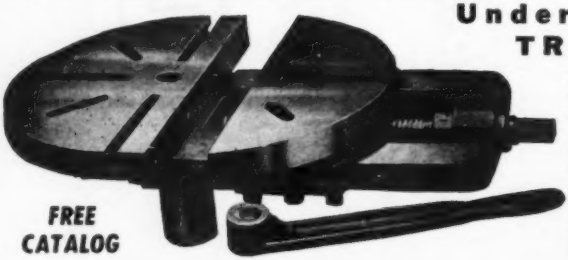
1¼" Cold Rolled

This machine cuts off and chamfers both ends of 1¼" cold rolled, 20" long, at the rate of one every 20 seconds.

1" Tubing

This machine cuts off and chamfers both outside edges of 3" long, at the rate of one every 3 seconds.

TRY THE MODERN SAFETY DRILL TABLE Under Our FREE TRIAL OFFER



FREE CATALOG

Combines drill table, vise, parallels and V-block. Insures safer, faster work. We guarantee it will save its cost on labor alone in 6 months or your money back. Write for folder, with typical set-ups and specifications of all models.

MODERN MACHINE TOOL COMPANY
Jackson, Michigan

No sir . . . They're OK hardened bedway cross sections!

These hardened ways, made by The Ohio Knife Co. give you an idea of the diversified shapes and sizes supplied. OK's special process of manufacture permits building to your specifications in a wide range of design.

Specially heat-treated tool steel makes OK ways practically wear-proof and helps maintain constant accuracy throughout the life of the machine. This extreme hardness, 65-66 Rockwell "C," is uniform to 3/16-inch depth or more.

Through Ohio Knife's own process, the long wearing tool steel is welded to a soft steel backing under 2500 tons pressure. Then precision equipment finishes the bedway with supreme accuracy by grinding to tolerances up to ± .0002 inches.

THE OHIO KNIFE CO.

CINCINNATI 23, OHIO

Write today to Dept. D for comprehensive bulletin, or send us your bedway specifications.

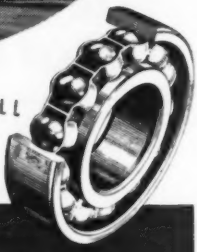
Manufacturers for the metalworking industry of:

SLITTER KNIVES • SHEAR BLADES • BRONZE WAYS
ROTARY SHEAR KNIVES • HARDENED SPACERS
HARDENED WAYS • BALL RACES
WEAR STRIPS • GIBS

every salesman an engineer

Close at hand to *lend* a hand! Whenever a design calls for **ball** bearings, call in your New Departure sales *engineer*. You'll find that he's a specialist in solving anti-friction problems. You'll find, too, that he cooperates efficiently with designers and engineers. He's backed by the industry's most complete research and manufacturing facilities. *Whatever your* **ball** *bearing needs, talk them over with a New Departure sales engineer.*

NOTHING ROLLS LIKE A BALL



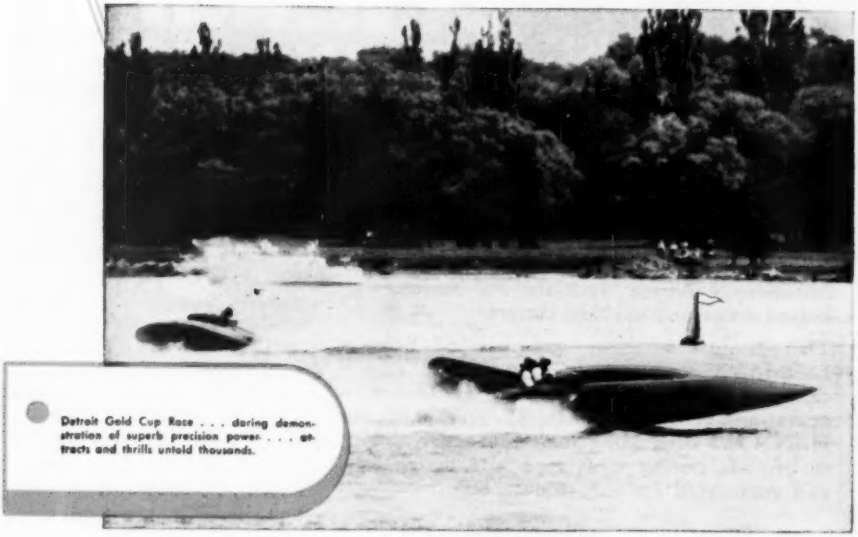
NEW DEPARTURE

BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN. • Plants also in Meriden, Conn., and Sandusky, O.

LOGAN . . . a national participant in major fluid power advancements

SINCE 1916



Detroit Gold Cup Race . . . daring demonstration of superb precision power . . . attracts and thrills untold thousands.

LOGAN AIR CONTROL VALVES

Model 6245—4-Way, 2-Position

- BALANCED PISTON
- COMPACT DESIGN
- EASILY INSTALLED
- SELF-CLEANING

79 MODELS

MOST MODELS STOCK DELIVERY

Let Logan Engineers help you design your Air and Hydraulic Circuits

Model 6540
4-Way, 2-Position

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AIR CONTROL VALVES, Cat. 100-4 • AIR CHUCKS, Cat. 70-1 • AIR CYLINDERS, Cat. 100-1 • AIR-DRAULIC CYLINDERS, Cat. 100-3
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SAVES TIME — Logan — AIR AND HYDRAULIC EQUIPMENT — REPEAT-MOTION

LOGANSPORT MACHINE CO., INC., 803 CENTER AVE., LOGANSPORT, IND.

The Problem:

PRECISION BORING TOOLS FOR A LARGE FARM IMPLEMENT MANUFACTURER

The Answer: Lehmann BORING TOOL

Receiving an order for a single end machine with which to semi-finish bore, finish bore, face and chamfer the steel for a final drive housing assembly of a large farm implement manufacturer, the W. F. and John Barnes Co., of Rockford, Ill., came to LEHMANN Boring Tool for the necessary boring tools and carbide cutters.

This is just another example of how LEHMANN stands ready to put more efficiency, accuracy and economy in your boring operations! For more than 35 years LEHMANN has been using their top experience to provide boring tools especially designed and engineered for industry.

5 Reasons Why You Cut Boring Costs with LEHMANN TOOLS

- **Tools are precision-built to give . . . ACCURACY**
- **Uniform design and structure of blocks and cutters gives . . . INTERCHANGEABILITY**
- **Tool construction rigid, rugged, yet simple, allows . . . INCREASED Speeds and Feeds**
- **Wide range of bores with a single tool, adjustable cutters, means . . . ECONOMY**
- **Wide range of ability! Our work with many industries assures . . . successful APPLICATION to YOUR needs**

Tell us your boring problems without obligation. Write today for CATALOG BT-12.

Photo courtesy of W. F. and John Barnes Co.

LEHMANN BORING TOOL

4389 Duncan Ave., St. Louis 10, Mo.

DIVISION OF NOVO ENGINE CO.

BURGMASTER

CAN INCREASE YOUR PRODUCTION *too!*

AS MUCH AS 50%...with
LOWER COST PER PIECE MACHINED
BETTER QUALITY OF PARTS
LOWER MAINTENANCE COST
LESS FLOOR SPACE
SIMPLE SET-UP

Model No. 2 A

THE ESS AUTOMOTIVE CORPORATION
MIDDLETOWN, CONN.

● *Manufacturers of Automotive Parts and Service Tools*

August 10, 1953

Burg Tool Manufacturing Co.
3743 Durango Avenue
Los Angeles 34, California

Attn: J. L. Burg, Vice Pres.

Gentlemen:

We have your letter of August 12, 1953. The performance of the Burgmaster, Model 2-A, is satisfactory and we have had a minimum of service problems with it. As far as production figures are concerned, we wish to advise that the machine has been converted to semi-automatic operation and consequently it can not be compared to our previous methods. Under the semi-automatic operation setup one operator can run two machines and give us about an 80% increase over the old four or five spindles on one table drill press.

As our production increases, of course we will need additional machines which will be sometime in the future.

We highly recommend this machine for use in both short-run setups and long-run setups, as the setting up and operation is so simple that it does not consume very much time.

If there is any additional information on the Burgmaster line, we would appreciate your sending it to us as we would like to keep up on the latest developments.

Very truly yours,

ESS AUTOMOTIVE CORP.

M. L. DURHAM

MLD:bwest:rcw

"The Brake Parts Line"

WRITE FOR CATALOG

SOME MFG. REP'S TERRITORY STILL AVAILABLE

BURG TOOL MFG. CO. DEPT. BB2

3743 DURANGO AVENUE • LOS ANGELES 34, CALIF.

CUTTING. New S.E.C.O. keeps parts and tools cooler. Tools last longer, require fewer grindings; production is increased; finishes are uniformly good.

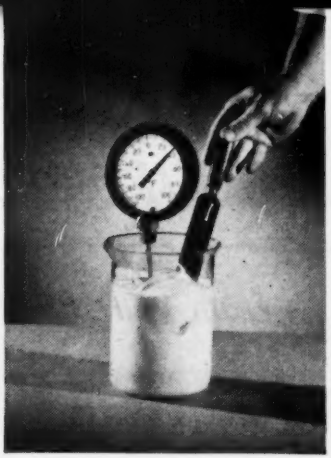
Now Better Than Ever!

Sunoco Emulsifying Cutting Oil

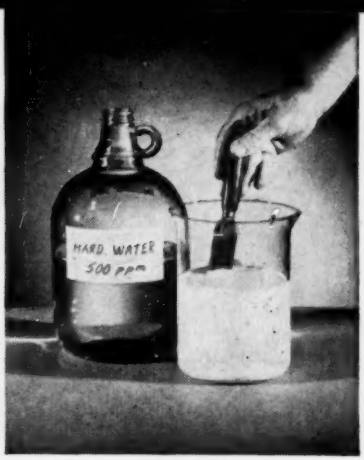
New refining facilities improve industry's most widely used cutting oil and permit it to give these added benefits

- **HIGHER MACHINING EFFICIENCY**—better finishes, longer tool life, increased production in cutting operations
- **INCREASED DETERGENCY**—particularly important in grinding operations—provides better surface finishes, prevents loading and glazing of the wheel, prolongs wheel life
- **BETTER MIXING QUALITIES**—in hot, cold or hard water
- **A PURER, CLEANER CUTTING OIL**—whiter, more stable emulsions; cleaner parts and machines; better operator acceptance
- **EASIER HANDLING**—pumps from storage tanks more readily, flows from drums faster
- **GREATER VERSATILITY**—can be used for rolling, washing and rust-proofing as well as cutting and grinding

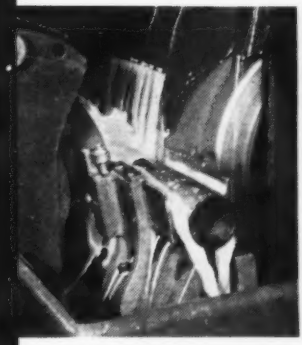
MIXES IN HOT WATER
This new S.E.C.O. mixes and remains stable even at 180 F., permitting its use in washing and rustproofing.



MIXES IN COLD WATER
New S.E.C.O. forms stable emulsions in the coldest water . . . even ice water does not affect it.

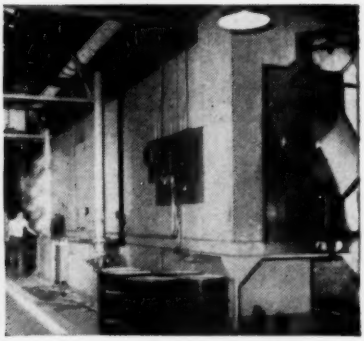


MIXES IN HARD WATER
New S.E.C.O. eliminates the need for special hard-water grades of emulsifying cutting oil.



GRINDING. New S.E.C.O. improves surface finishes because its increased detergency prevents loading and glazing of grinding wheels, prolongs wheel life.

RUSTPROOFING. New S.E.C.O. is a better hot rust-proofing medium. It forms stable emulsions, coats metal parts uniformly, protects them against rusting.



WASHING. Because of its increased detergency and its ability to mix and remain stable in hot water, New S.E.C.O. is better for removing grease and dirt.

TEST THIS NEW S.E.C.O. IN YOUR OWN PLANT. For more information, call your nearest Sun office or write SUN OIL COMPANY, Phila. 3, Pa., Dept. MT-2.

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SUN OIL COMPANY

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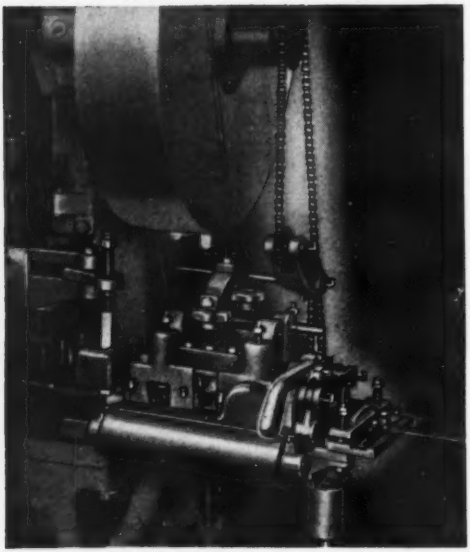
Made by the producers of famous Blue Sunoco Gasoline and Dynalube Motor Oils

GET **RAPID-FIRE PRODUCTION**

from your PUNCH PRESSES

IT'S EASY WITH **WITTEK**

Automatic Roll Feeds



Step up production by making your punch presses automatic! Wittek automatic roll feeds fit all makes and sizes of punch presses — provide maximum efficiency and extreme accuracy in the high-speed automatic feeding of strip stock. They are made in single roll, double roll, and compound types with straighteners, in models to feed (push or pull) in any of four directions. Length of feed is quickly and easily adjusted to meet individual job requirements.

4404

WITTEK Reel Stands

Simplify Handling of Coiled Stock

A choice of standard models is available to facilitate handling a large variety of coiled stock . . . from small, light coils to those weighing up to 800 pounds. These larger reel stands automatically center the coils and provide frictional braking action to prevent overrunning and maintain uniform coil slack.

Write for full particulars

WITTEK Manufacturing Co.

4321 W. 24th Place, Chicago 23, Illinois

Automatic ROLL FEEDS AND REEL STANDS

J & L DIE HEADS OFFER *everything!*

- ✔ LOW INITIAL COST
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FOR BROWN & SHARPE AUTOMATICS and SMALL TURRET LATHES
Capacities from #0 to 1¼"

RADIAL CHASER TYPE
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TANGENT CHASER TYPES
Stationary and Revolving
Capacities from #4 to 2"

Only J & L Die Heads and Chasers give you ALL these features. Write to Dept. 710 for illustrated catalogs and complete information.

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J&L THREAD TOOL DIV.

"61"
Port-A-Belt
TRADE MARK

GRINDING ATTACHMENTS

convert your portable tools into fast, efficient BELT GRINDERS

On every straight-spindle tool in your shop, you can "bring the abrasive belt to the work" with sturdy "61" PORT-A-BELT Grinding Attachments by CARBORUNDUM. You get versatility and economy unmatched by any other portable tool—fast, low cost grinding on *any* surface... even the awkward, hard-to-reach areas!

The four PORT-A-BELT attachments easily do contact wheel grinding on flat, convex or concave surfaces—and slack-of-belt grinding on flat, irregular or convex. One operation with PORT-A-BELT often replaces two or three with conventional finishing tools. Saves time, money.

Every PORT-A-BELT unit is equipped with CARBORUNDUM's famous "61" Contact Wheel, with its serrated rubber face. When used with CARBORUNDUM® Brand Abrasive Belts, these contact wheels give you smooth, cool, rapid cutting... without bounce or chatter. Belts last up to twice as long because they don't load up as fast.

PORT-A-BELT Grinding Attachments are precision-made, sturdy enough to take more than normal shop abuse. There's nothing to get out of adjustment!

YOUR CARBORUNDUM DISTRIBUTOR OR SALESMAN will show you how to convert your straight-spindle grinders into fast, efficient belt grinders. He's listed in the yellow pages under "Abrasives." Or, if you prefer, send the coupon.

THE CARBORUNDUM COMPANY
Dept. BB 82-41, Niagara Falls, N. Y.

Yes! Send folder and prices on PORT-A-BELT Grinding Attachments to:

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REGISTERED TRADE MARK

...continually putting more sense in your abrasive dollar!

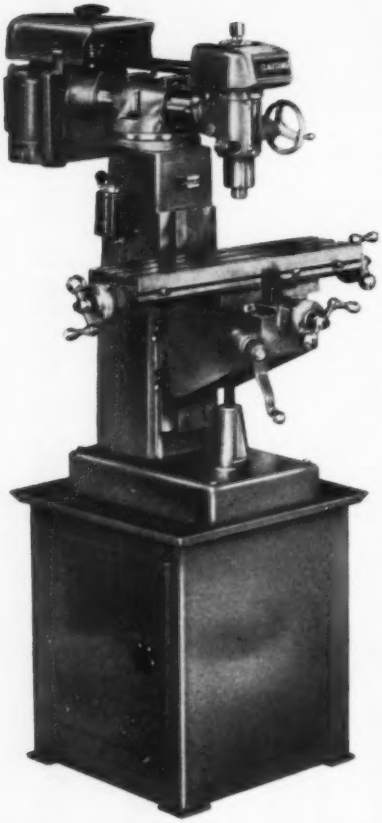
82-41P

versatility
accuracy
economy

another great new PLUS...

The CLAUSING VERTICAL MILLER

is NOW READY FOR YOU!



The new Clausing Vertical Milling Machine has more Plus Value features than have ever before been available in a miller at or near its price!

It has Versatility Plus! It is actually several machines combined in one. The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane making it possible to mill, drill, bore, ream and shape at all angles, with one setup.

It has Accuracy Plus! The heart of the Clausing Mill is its rigid, high precision spindle head. It has 7 ball bearings — spindle is chrome nickel steel, hardened and ground — quill, hardened and ground, has honed bearing seats — overarm is rigid steel casting with ¾" thick walls precision ground. All feed screws have ground threads, turn on ball bearings. Table surfaces and dovetail ways on table, saddle, knee and column are precision ground.

It has Economy Plus! The Clausing reduces setup and operating costs. It's low in initial investment, low in upkeep costs.
Write today for the complete story!

CONDENSED SPECIFICATIONS

Size of Table	6" x 24"
Longitudinal Table Travel	15"
Transverse Table Travel	5"
Vertical Table of Knee	12"
Maximum Distance Spindle to Table	12"
Maximum Distance Spindle to Column	8¾"
Quill Travel	3"

Spindle Speeds: Six, 180 to 3250 R.P.M.
No. 7 Brown and Sharpe or No. 2 Morse Taper Spindle Optional.
Operates from ½ or ¾ HP, 1725 R.P.M. Motor

MILLS, DRILLS, BORES, REAMS AND SHAPES . . .
AT ALL ANGLES . . . WITH ONE WORK SETUP!

CLAUSING DIVISION, *Atlas Press Company*
2-107 NORTH PITCHER STREET, KALAMAZOO, MICHIGAN

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PRECISION MACHINE TOOLS
DIVISION ATLAS PRESS COMPANY
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SOCKET SCREW PRODUCTS
You can't keep production up when socket screw problems are getting you down. Even such a small thing . . . one screw that doesn't start quickly or drive home correctly . . . perhaps a shipment that doesn't arrive on time . . . can hamper a fast-moving production line.
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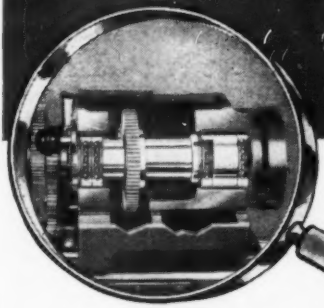
Close-Up Look Tells Why...

THE NEW 12" SWING

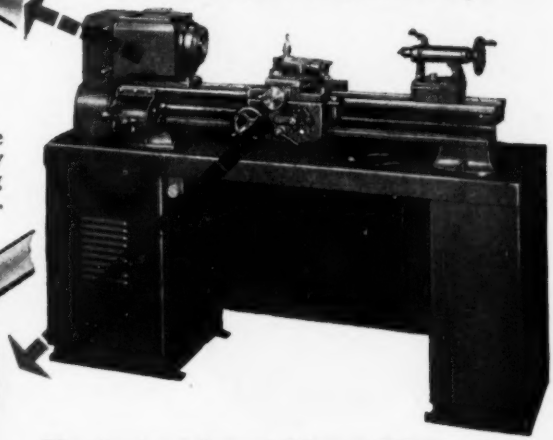
Logan LATHE

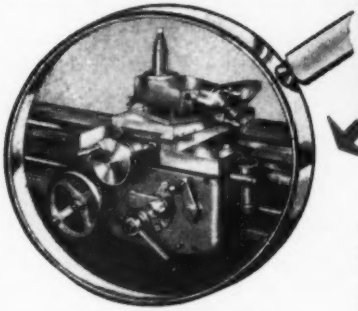


The HEADSTOCK Is Rugged and Rigid

Massively proportioned spindle for extreme rigidity on heavy cuts. Oversize ball bearing mounting for sustained accuracy.

For Production, Maintenance, Tool Room or School Shop





The CARRIAGE Is Massive, Convenient

Large dials have widely separated graduations for accurate reading. Precision ground surfaces on cross slide and saddle permit mounting fixtures and use of magnetic indicators. Extra wide and long bearing surface. Convenient, lever-operated, disc type clutch. Heavy compound for rigidity.

The closer you inspect this new 12" swing Logan Lathe, the *better* it looks. The advanced design of individual parts, and the precision construction throughout become more evident. You will like the size, too. Its 35" center distance, 1¾" spindle hole, 1" collet capacity, and rugged, massive proportions mean extra capacity, stability and power. Keep this newest Logan in mind as you make plans for your production line, tool room, shop, or student training program. The quality you see in your close-up look will serve you well through extra years.

Brief Specifications of Logan 12" Lathes

Swing over bed and saddle wings, 12"... Center Distances, 23" and 35"... Turret Lathe Models have 43" bed length... 1⅜" spindle hole ... 1" collet capacity ... 16 spindle speeds, 38 to 1260 rpm.

Get full facts—See your Logan Dealer—or WRITE to

LOGAN ENGINEERING CO.

Lawrence and Lamon Avenues Chicago 30, Illinois

LOOK TO LOGAN FOR BETTER LATHES AND SHAPERS

SPEEDY AIR VISE

SPEEDS UP

√ MILLING	√ PUNCHING
√ DRILLING	√ BENDING
√ TAPPING	√ RIVETING

GRIPPING FORCE 15 TIMES AIR LINE PRESSURE

Speedy Air Vise helps you do dozens of operations faster, better, cheaper—by air pressure! Foot control valve opens and shuts vise instantly, leaving *both* hands free to produce *more!* Jaw opens up to 3 inches, holds castings, parts, jigs, etc. Compact, trouble-free, inexpensive.
Complete with Foot Control Valve, Air Hose and Fittings . . only **$36.00**

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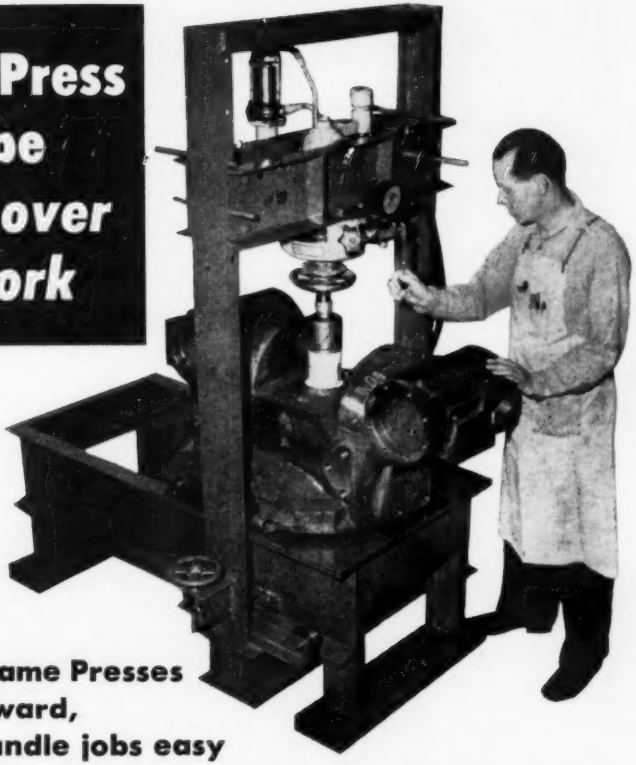
AIR REGULATOR
Precision-built. Delivers pressures up to 140 lbs. With gauge, $5.95. Less gauge, $3.25.

AIR FILTER
Keeps water and particles out of the regulator and pneumatic tools. $3.00

BLOW-GUN
Looks and operates like a gun. Ideal for cleaning and blowing out chips, dust, filings, scraps, etc. . . $3.00

W. R. BROWN CORP. · 2651 NORMANDY AVE. · CHICAGO 35, ILL.

THIS Press can be moved over the work



DAKE

Movable Frame Presses make awkward, hard-to-handle jobs easy

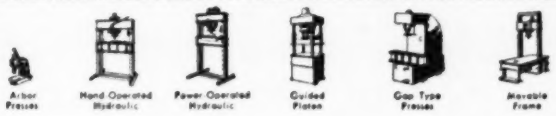
Here is the hydraulic press you need for work on awkward, heavy parts, and for handling large straightening jobs. Parts can be loaded on the work table with a hoist or fork truck—then the frame and workhead are centered over the job. The channels and workhead are easily raised or lowered if necessary to accommodate for work height.

DAKE Hydraulic Presses with movable frames are designed for hand, pneumatic, or electric operation. Capacities range from 25 to 300 tons. For detailed information, write for Bulletin 269.

In addition to conventional hand, air and electric hydraulic presses, Dake makes gap type, guided platen, and other special purpose presses.

Dake Engine Company, 608 Seventh St., Grand Haven, Mich.

DAKE PRESSES



ROCKFORD *Hydraulic* SHAPERS

Rockford Openside Shapers provide numerous improvements in the production of small planing and large shaping work. Reciprocation of the work, instead of the tool, provides planer accuracy, eliminates overhang and reduces wear. Stroke lengths, feed and cutting speeds are quickly adjustable within the range of the machine.

A wide variety of sizes—36", 48", 60" and 72" stroke are available.

Investigate these shapers . . . as modern in machine tools as tomorrow's jets. A Rockford Machine Tool Co. representative will give you complete information.

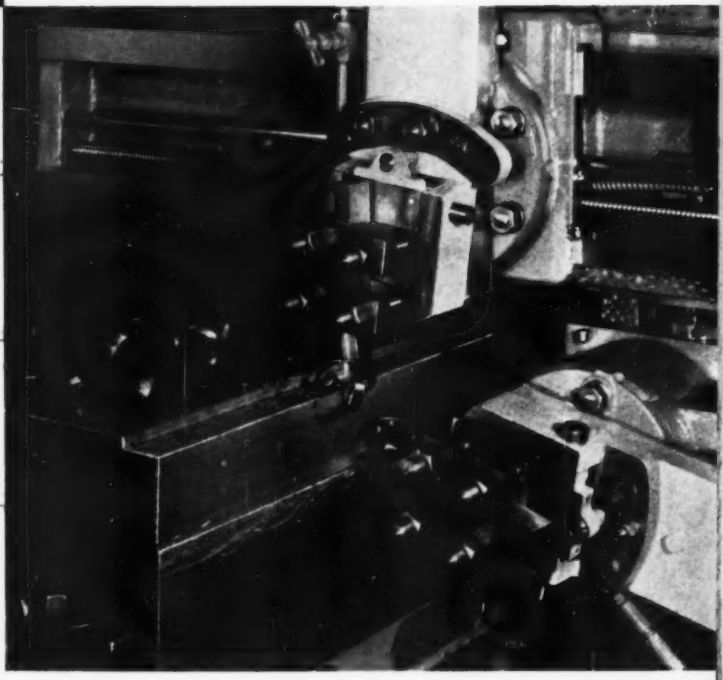
FEATURES:

Side Head

Hydraulic Tool Lifters (For Rail and Side Heads)

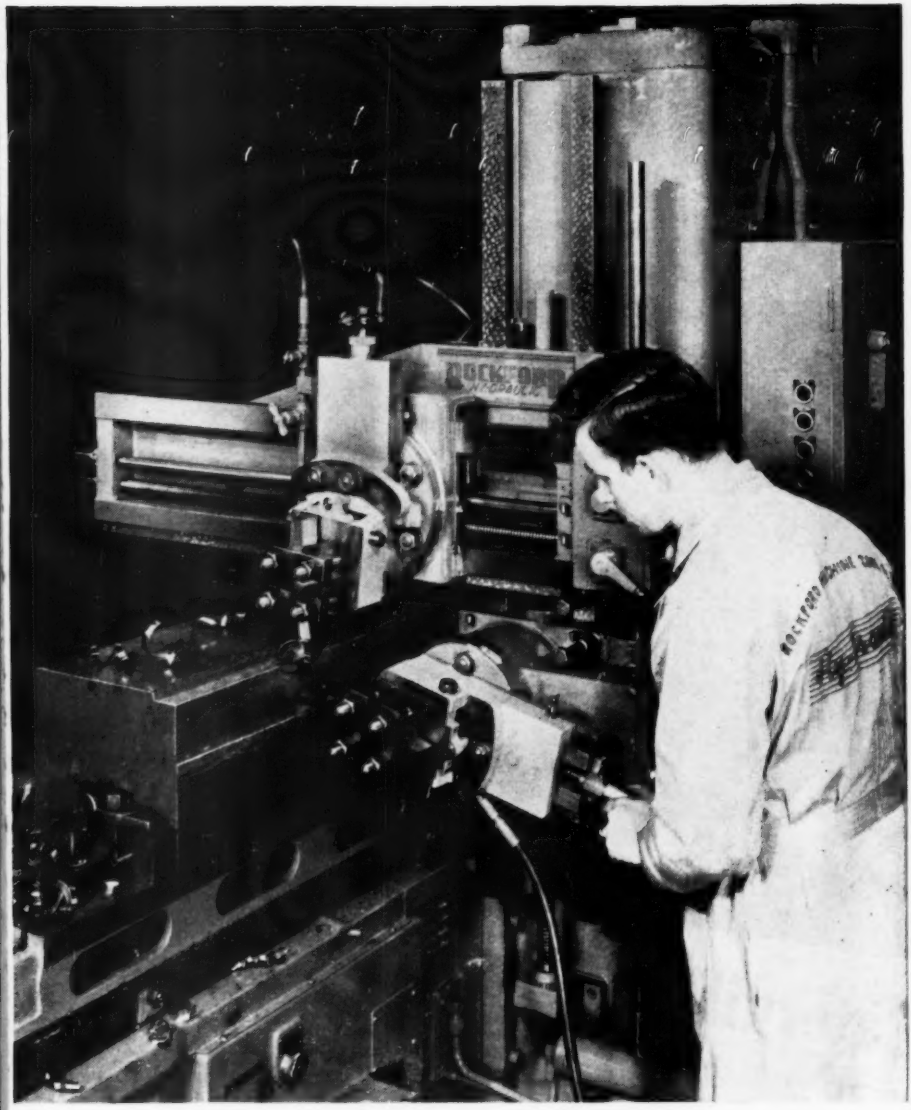
Power Rail Elevation

10 hp 1200 rpm
220/440 volt
3 phase 60 cycle
Open Ball Bearing
Motor and Control



shaping • planing • duplicating • turning

OUR 51st YEAR



Rockford Machine Tool Co. Rockford, Illinois

Report from Peoria...on Big-Gear

Caterpillar
REG. U. S. PAT. OFF.

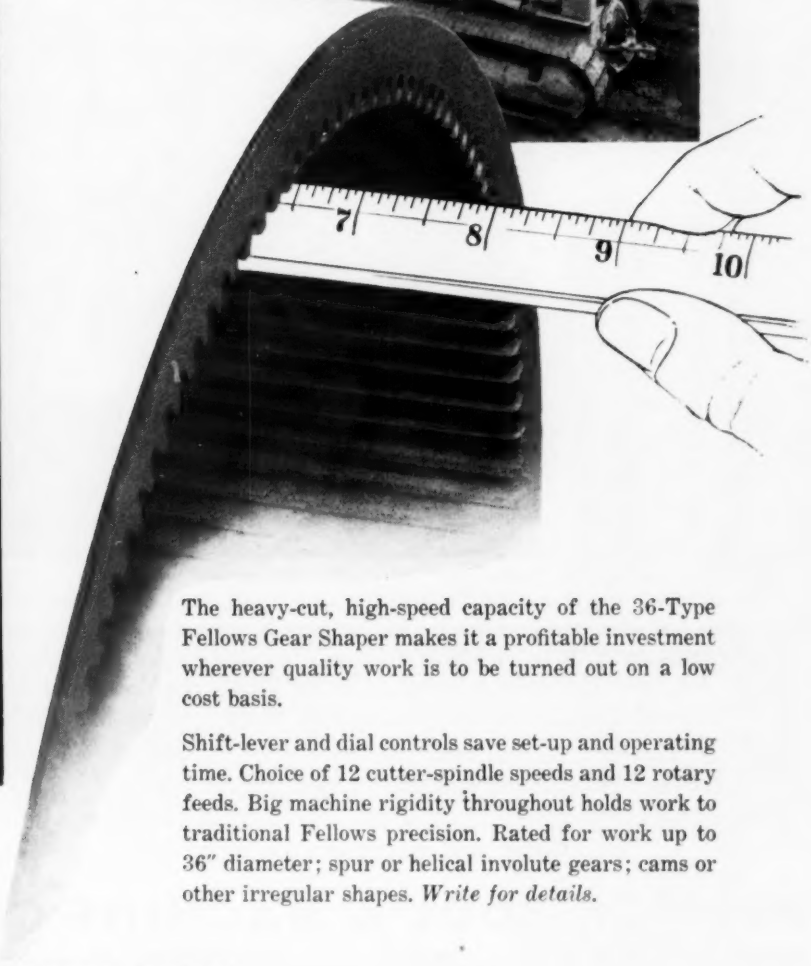
selects Fellows 36-Type Gear Shapers, at its Peoria Plant, for high production on unusually wide-face steering clutch drum gears for its Track-type Tractors and No. 6 Shovels.*

**Specially arranged for 6" face-width; standard face-width capacity is 6".*

Time-study Performance: Internal C.I. Gear with 128 8-pitch teeth of 8 inches face width – ACTUAL CUTTING TIME, 29.339 MINUTES. Finished in one cut with Gear Shaper operating at 50 strokes per minute, .0408" rotary feed.

THE Fellows

Cutting



The heavy-cut, high-speed capacity of the 36-Type Fellows Gear Shaper makes it a profitable investment wherever quality work is to be turned out on a low cost basis.

Shift-lever and dial controls save set-up and operating time. Choice of 12 cutter-spindle speeds and 12 rotary feeds. Big machine rigidity throughout holds work to traditional Fellows precision. Rated for work up to 36" diameter; spur or helical involute gears; cams or other irregular shapes. *Write for details.*

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PROGRESS 1893-1954

In 1893, the first PEDRICK BENDER was made. That was during the same era when the costume on the left was in style. Here is the latest PEDRICK PRODUCTION BENDER which is as modern as the costume on the right. PEDRICK PRODUCTION BENDERS are now used for cold bending pipe, tube, reinforcing bars, angles and many intricate structural shapes.

PEDRICK PRODUCTION BENDER prices start as low as $1575.00 for the model "A-3".

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PEDRICK TOOL & MACHINE CO.

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Standard Carbide Reamers

In Stock! All Types!

Ask for Standard Carbide Reamer Circular No. 542 for complete data and net prices. Special reamers also made promptly to your specifications.

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Super TOOL COMPANY

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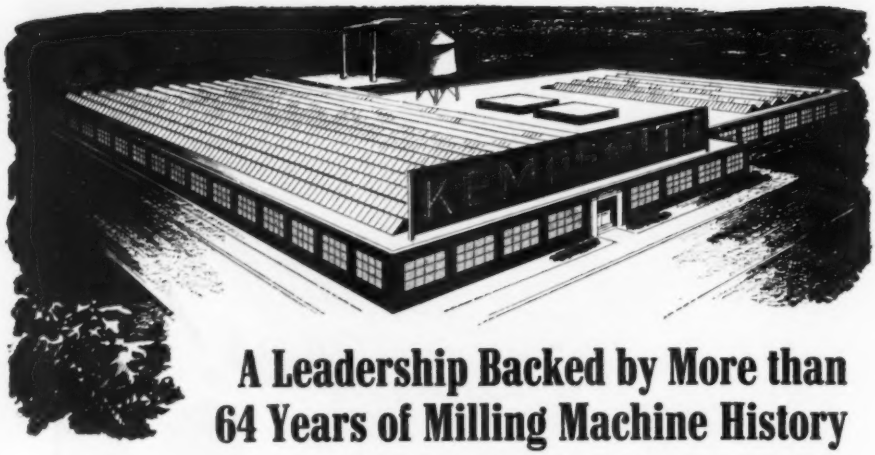


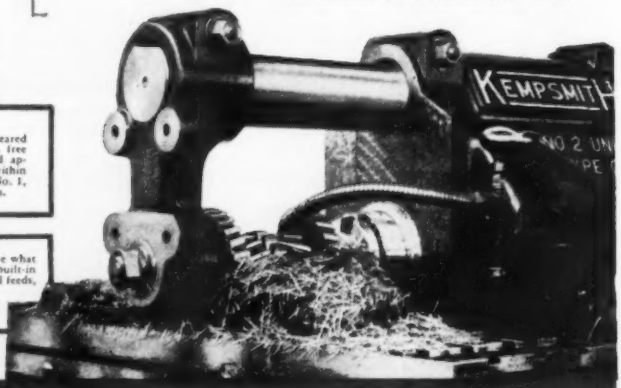
A Leadership Backed by More than 64 Years of Milling Machine History

Back in 1888, Kempsmith Engineers developed and produced the first Kempsmith Miller — a machine that was destined to achieve world-wide fame. The successful performance of this early model encouraged important engineering improvements and refinements resulting in much greater speed and precision in milling operations. Today, Kempsmith continues as a leader in the industry. The ruggedness, precision and ability to take heavy cuts smoothly make Kempsmith Milling Machines ideal for production, toolroom or general purpose milling. If you have a milling problem, consult Kempsmith. Our engineers will gladly give you the benefit of their broad experience in this specialized field.

THE KEMPSMITH MACHINE CO.
MILWAUKEE 14, WISCONSIN, U. S. A.

Kempsmith Type "G" Plain Miller. All geared for positive power and smooth cutting, free from chatter. Note rugged, streamlined appearance. All controls are grouped within easy reach of the operator. Available in No. 1, 2 and 3 sizes, plain and universal models.

Let the chips fly! Kempsmith Millers have what it takes for tough production battles — built-in ruggedness, increased range of speeds and feeds, greater power. Every machine is precision-built, the product of 64 years of milling machine experience.



KEMPSMITH

Milling Machines Since 1888

A-7270-LPC

MILLING MACHINE ARBORS, ADAPTERS, ARBOR SPACERS AND BEARINGS

STYLE "B" ARBOR

Standard American Dimensions

Tested for Performance

Immediate delivery from New York Stock

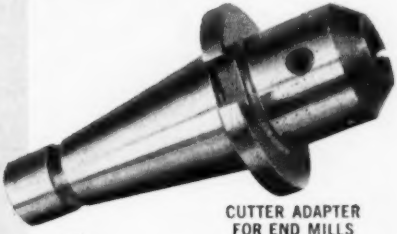
MADE IN GERMANY

Low Competitive Prices

STYLE "C" ARBOR

Hardened and ground to high standards of accuracy and quality by long established, reputable, West German Manufacturer.

ADAPTER FOR TAPER SHANK TOOLS



CUTTER ADAPTER FOR END MILLS

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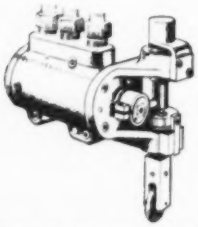
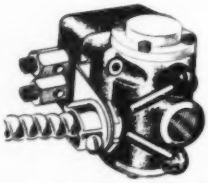
UNBRAKO SOCKET CAP SCREWS have knurled heads for sure grip and fast assembly; accurate hex sockets for positive, nonslip internal wrenching; fully formed threads, Class 3 fit. They are made of heat treated alloy steel, with controlled fillet and continuous grain flow; are available in standard sizes from #4 to 1".



USE UNBRAKO SOCKET CAP SCREWS for compact designs to save space, weight and material in machine tools and equipment.



On textile machines, automotive equipment, electrical and electronic devices, and production machinery.

Do you really need a special UNBRAKO ?

Before you specify a special socket screw, check UNBRAKO Standards. A standard UNBRAKO will do the same job much cheaper in most cases. You'll get better service and faster deliveries, because UNBRAKO socket screw products are stocked by your industrial distributor. Write for UNBRAKO Standards. STANDARD PRESSED STEEL Co., Jenkintown 52, Pa.

UNBRAKO SOCKET SCREW DIVISION

SPS

JENKINTOWN PENNSYLVANIA

On precision instruments, dies, jigs and fixtures, and many other applications too numerous to mention.

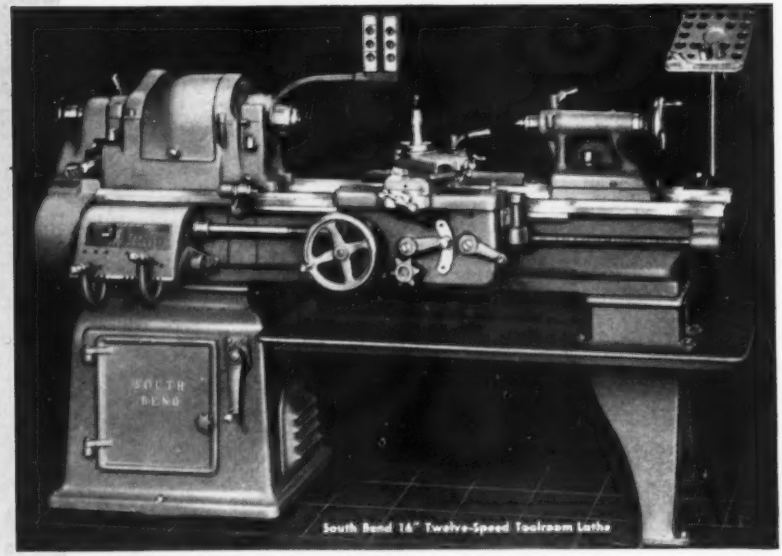
UNBRAKO Standards—as listed in the SPS Catalog—are stocked by leading industrial distributors everywhere.

Cuts Machining Time

SOUTH BEND 12 SPEED LATHE

The wide range of spindle speeds on this new lathe cuts machining time because the operator quickly selects the right speed for each operation. Pushbutton control provides a fast change from any high speed to the corresponding low speed. This versatility is further increased by 48 choices of longitudinal and cross feeds which insure maximum efficiency on every job.

CL8155C, illustrated below, f.o.b. factory, less motor and controls. Time payment terms: 10% down, balance 12 or 18 months. **$2690.00**



South Bend 16" Twelve-Speed Toolroom Lathe

SPECIFICATIONS

Spindle Speeds (approx.) Direct: high range 300, 550, 945; low range 150, 278, 475. Back gear drive: high range 32, 70, 118; low range 20, 33, 60.

Spindle Bore — 1⅜".

Swing over bed and saddle wings — 16¼".

Swing over saddle cross slide — 9⅝".

Distance between centers — 33¼", 45¼", 57¼", 81¼", 105¼".

Collet Capacity — 1" maximum.

Longitudinal Feeds — 48 R.H. or L.H., .0015" to .0841".

Cross Feeds — 48, .0006" to .0315".

Thread Pitches — 48, 4 to 224 per inch.

Yes—you can get most any South Bend product immediately from our distributor's stocks in principal cities. Items not stocked, shipped promptly from factory.

Three ways to order:

1. See or telephone nearest distributor
2. Order by mail from your distributor
3. If no distributor is nearby, order direct from factory.

South Bend machine tools with accessories may be purchased on convenient terms up to 12 months.

SEND INFORMATION CHECKED:

☐ 9" and 10" BENCH LATHES

☐ 10" to 16-24" FLOOR LATHES

☐ DRILL PRESSES

☐ TOOL GRINDERS

☐ ½" & 1" Collet TURRET LATHES

☐ 7" BENCH SHAPERS

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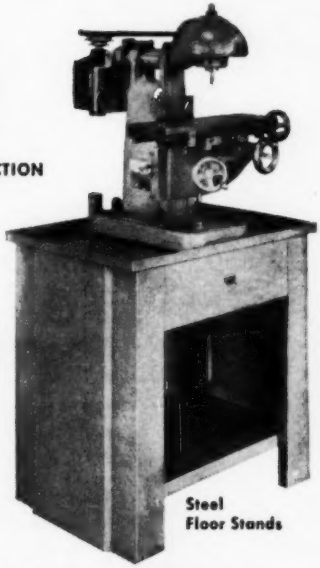
Building Better Tools Since 1906 • **SOUTH BEND LATHE** • South Bend 22, Indiana

These 3 precision Benchmasters make money in every shop!

HORIZONTAL MILL

PRODUCTION MILL

VERTICAL MILL



Steel Floor Stands

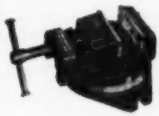
It's real economy to equip your shop with one or more Benchmaster mills. Why? Because these millers do small jobs with the same precision and speed as big, expensive mills. In fact, several small Benchmasters will even outproduce a big mill on work within their capacity! But consider the tremendous difference in investment and savings made! Set-ups are easier and faster. Operation is simple, cutting operator costs!

MILL HORIZONTALLY OR VERTICALLY WITH THE SAME MACHINE! Simply exchange spindle assemblies to convert. Production models with lever feed also available.

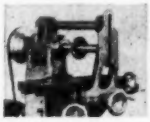
Ask for complete information on Benchmaster Mills today! Benchmaster Manufacturing Co., 1835 W. Rosecrans Gardena, Calif.

Full line of accessories for every milling requirement!

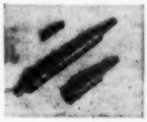
6" and 8" Rotary Tables



Swivel-Base Vise



Overarm Brackets



Arbors and Collets

benchmaster

World's largest manufacturer of small punch presses and mills.

Warplis

WHY Warplis STANDS ALONE

Take the steel.....Non-warping oil hardening electric furnace tool steel long favoured for ease of working, for safe hardening, for fine performance . . . for excellent hardness and toughness without appreciable warpage or dimensional change. No worker in fine steel is unfamiliar with this time-tested, non-touchy analysis:

Carbon	.90	Manganese	1.10
Chromium	.50	Tungsten	.50
		Vanadium	.15

the finish.....Grinding—precision grinding—assures extremely close accuracy, uniformity, trueness to section, straightness,

the scope.....Some 400 stock sizes ranging from husky die sections to

Other "Pittsburgh" products

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ROUNDS

Dukane Drill Rods
water hardening

Monaca Drill Rods

accuracy, uniformity, trueness to section, straightness,

the scope.....Some 400 stock sizes ranging from husky die sections to ribbon-like flats and tenuous squares and rounds.

FLATS & SQUARES	**WARPLIS FLAT STOCK** **Flats $\frac{1}{64}$" to $1\frac{1}{2}$" thick X widths up to 12"** **Squares $\frac{1}{8}$" to 4"**
ROUNDS	**WARPLIS DRILL RODS** **$\frac{1}{32}$" to 2" diameter**

the availability....From "Pittsburgh's" selected distributors coast to coast . . . in quantity for a production run or a single piece for an emergency job.

and the saving....None of the time and talent of the skilled tool, die or precision parts maker need be spent on get-ready—no metal wasted. Procedures may be simplified . . . guess work removed . . . quality improved . . . time and money saved . . . by standardizing on this single fine grade for all requirements—flats, squares and rounds.

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See your Warplis distributor
or write "Pittsburgh" for descriptive price folders.

Monaca Drill Rods

High Speed Drill Rods

●

FLATS and SQUARES

Reliance Drill Rods
water hardening

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Cold finished tool and alloy steels in all sizes and shapes, including odd or irregular sections.

PITTSBURGH TOOL STEEL WIRE CO.

Since 1902 . . . makers of cold finished fine steels in all sizes, grades and shapes

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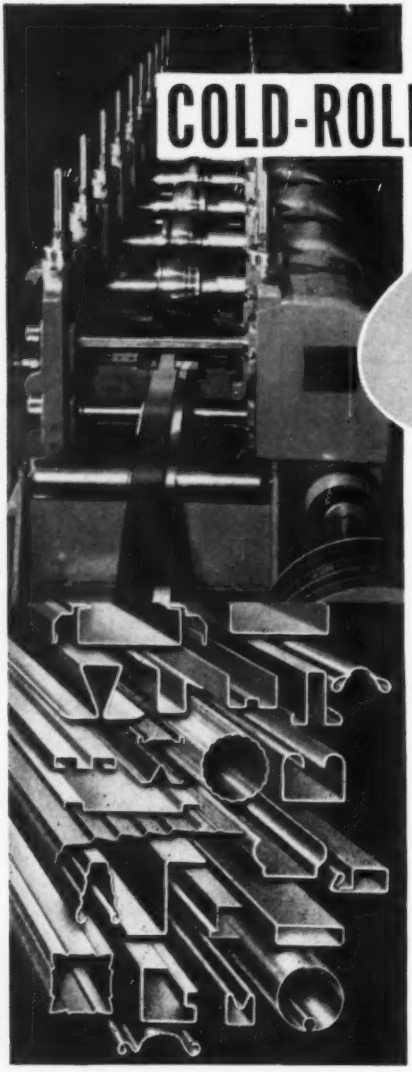

COLD-ROLL FORMING...

a CHALLENGE *and a* PROMISE

● Cold Roll Forming holds a perpetual challenge to your skill and ingenuity in devising new ways to step up production and reduce cost. Infinite possibilities are suggested by thousands of existing applications in the high-production metal working industries.

New applications are constantly being discovered. Total production of Yoder cold roll forming machines now runs into billions of feet annually.

A Yoder roll forming machine can be arranged for doing other operations, such as notching, embossing, perforating, curving, coiling, welding, etc., at little or no extra labor cost. Yoder engineers are at your service in designing such multi-purpose production lines.

The Yoder Book on Cold Roll Forming discusses its varied functions and advantages, with scores of photos illustrating end uses of roll formed products. Ask for it.

THE YODER COMPANY
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Complete Production Lines

★ **COLD-ROLL-FORMING** and auxiliary machinery
★ **GANG SLITTING LINES** for Coils and Sheets

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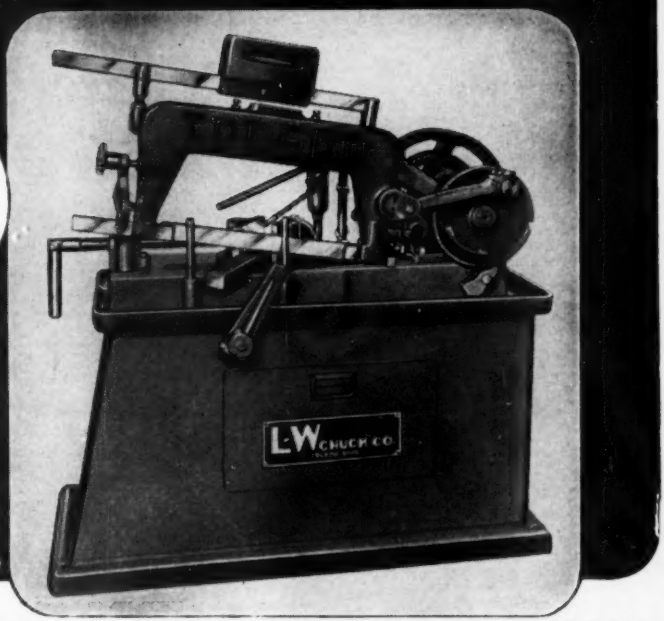
LW POWER HACK SAWS

Everything You Want in a Good High Speed Saw at an Ever-So-Low Price!

ONLY $297.56



Stops automatically on completion of cut. Automatic relief of saw blade on non-cutting stroke. 6" x 6" capacity using 10" x 14" blades. 12" x 3" clutch pulley. Pulley speed 120 r.p.m. Coolant pump base. Swivel vise for angle cuts. All steel welded base and table. V-belt drive. Rigid frame. Gravity feed. Length gauge. Expanding clutch. 3-speed (90 to 130 r.p.m.). V-belt motor drive arrangement. $32.21, less motors. ½ H.P. 1725 R.P.M. motor recommended. Completely motorized with switch; Single Phase $390.24; Three Phase $397.03.

IMMEDIATE DELIVERY — Order from your industrial supply distributor or order direct, giving name of your distributor.

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products

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INDIVIDUAL VULCANAIRE DUST COLLECTING UNITS

Are used on surface and other grinders where grinding dust must be removed.

Inexpensive, compact units, with no moving parts. Operated from your present air supply.

Installed in a few minutes, eliminating need for costly centrally located dust collecting systems.

The collector element is mounted on the side of the machine. Quickly cleaned, requiring no refills.

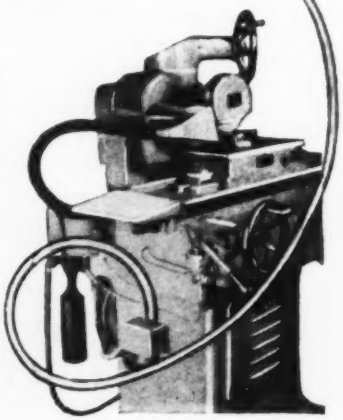
Vac-suction pick-up device (vacuum nozzle) is mounted on the grinding wheel guard or close to grinding wheel on other applications. This mounting permits constant contact with dust as the wheel is moved up or down.

A simple needle valve operates the unit, and can be shut off whenever the machine is not in use.

Available in 700 series for grinding wheels 7" dia. or less.

Made by the makers of Vulcanaire *The* jig grinding attachment.

Write on your letterhead for "Dust Collector" Booklet.



VULCAN TOOL CO.

HIGHLAND AND LORRAINE, DAYTON 10, OHIO

Almost every new twist drill that comes into your shop has been ground on a Sellers Drill Grinder!

The
SELLERS 6-G
DRILL GRINDER
5/16" to 3" Capacity

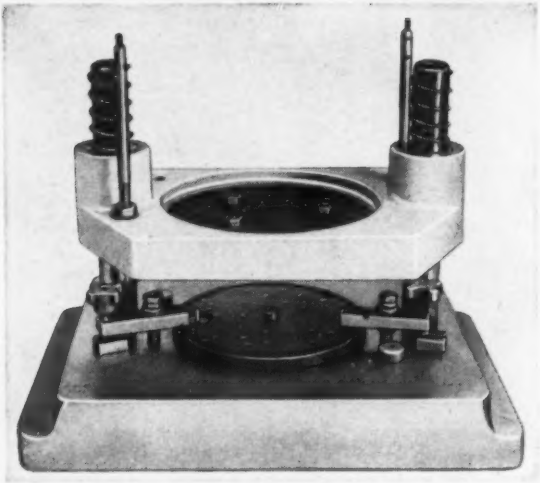
CONSOLIDATED MACHINE TOOLS

CONSOLIDATED
MACHINE TOOL CORPORATION

WHOLLY OWNED SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED

ROCHESTER, NEW YORK

HERE'S THE NEW Zagar Standardized Self-Clamping DRILL JIG



Zagar Drill Jigs are used in conjunction with Zagar gearless multiple spindle drill heads to ream, drill, tap on standard drill presses and tapping machines.

4 types—9 sizes, 5 combinations per size—hole patterns 3" through 15" dia.

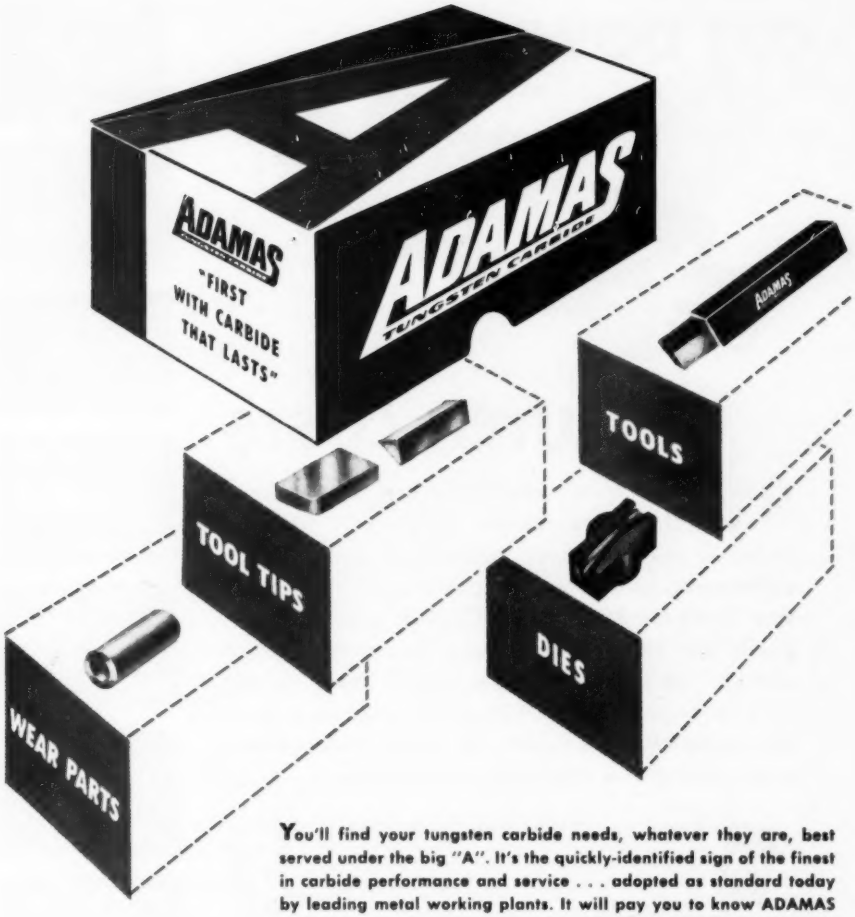
Nothing Else Like It!

SPEEDY — ACCURATE — RUGGED . . . A new concept to reach new production highs! Standardization means quick delivery and attractive price, since only a very few minor parts have to be made. Extremely fast; the operator merely feeds the parts — the Zagar Self-clamping Drill Jig does the rest. Proven design insures maximum accuracy.

Ask for Our New Data Sheet "B-2".

ZAGAR TOOL, INC., 24000 LAKELAND BLVD., CLEVELAND 23, O.

Zagar TOOLS FOR INDUSTRY and SPECIAL MACHINERY



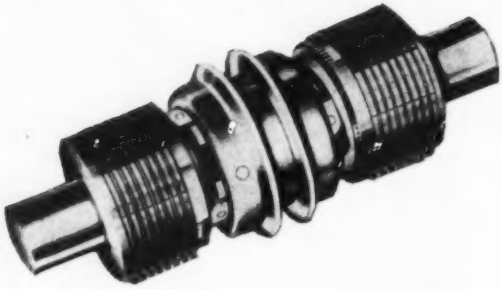
You'll find your tungsten carbide needs, whatever they are, best served under the big "A". It's the quickly-identified sign of the finest in carbide performance and service . . . adopted as standard today by leading metal working plants. It will pay you to know ADAMAS better, too . . . place your next order with ADAMAS and be convinced.

ADAMAS

TUNGSTEN | CARBIDE

ADAMAS CARBIDE CORPORATION · KENILWORTH, NEW JERSEY

CUT DOWN



CLUTCH COSTS

ROCKFORD clutch engineers are helping product designers reduce costs — by making possible *quicker clutch assemblies, easier clutch adjustments,* and *after-sale clutch service unnecessary.* Because ROCKFORD CLUTCH precision, capacity and stamina are greater than ever, product owners' up-keep costs are lower. Now is the time to have ROCKFORD clutch engineers give *your product* the benefits of lower clutch costs plus competitive operating advantages.

Send for This Handy Bulletin

Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

ROCKFORD CLUTCH DIVISION

BORG-WARNER

1309 Eighteenth Avenue, Rockford, Illinois

ROCKFORD CLUTCHES

NEW

ROTOR PENCIL AIR GRINDER

FOR DIES . . . PATTERNS . . . 1001 GRINDING JOBS

40,000 R.P.M.

POWERFUL!

Only 13 ounces

Handy

Rugged–Steel

SPECIFICATIONS

WEIGHT	13 ounces
LENGTH	5 3/4"
DIAMETER	1"
FREE SPEED	40,000 R.P.M.
COLLET	1/8" or 1/4"

Equipment (Standard)
8 ft. hose and air strainer. Push throttle. Collet wrench. 1/4" collet.

Equipment (Optional)
1/8" collet chuck
Steel rear head. 1/8" air inlet.
Steel rear head. (right angle) 1/4" inlet
Tool post holder (extra cost).

AIR

THE ROTOR TOOL CO.

CLEVELAND, OHIO

HIGH CYCLE

TODAY'S BEST BUY!

JOHNSON Model B

A full 5" x 10" capacity, low cost, handy saw for use in both small and large plants. Get details. Write today.

THERE IS A JOHNSON DEALER NEAR YOU

JOHNSON MANUFACTURING CORP.

ALBION, MICHIGAN

PYLE NATIONAL INCREASES PRODUCTION 47%!

Soldering Of Spring Assemblies Speeded By *LINDBERG* Induction Heating Unit

An hourly production increase of 47% . . and a per-operator production increase of 330% through the use of a Lindberg Induction Heating Unit! These are the money saving facts and figures reported by Pyle National Co., Chicago manufacturer of electrical components.

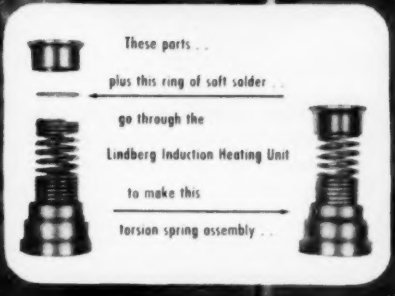
The company uses a 10 KW Lindberg unit for the production soldering of flanges to coil springs in the manufacture of torsion spring assemblies. The time cycle is 11 seconds for each assembly.

Production has been increased to 125 assemblies an hour . . with one girl operating the equipment. This is an hourly increase of 40 assemblies over the former method where soldering was done by a team of three men using gas torches. And the hourly per-operator production is up from 28 to 125!

With the induction heating unit, there are no open flames from gas torches. No extra exhaust fans are required . . there is little danger of burns to operators . . fire hazards are virtually eliminated!

And there is a substantial economy of floor space! Formerly the three torch operators required more than 60 square feet of floor space . . but the Lindberg Induction Heating Unit requires less than 30 square feet.

If your requirements call for production soldering, brazing, hardening, annealing, stress relieving, hot forming, forging or shrink fitting, investigate Lindberg Induction Heating Units. Ask for Bulletin 1440.


These parts . .
plus this ring of soft solder . .
go through the
Lindberg Induction Heating Unit
to make this
torsion spring assembly . .

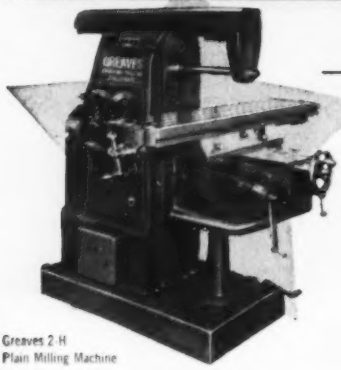
LINDBERG

HIGH FREQUENCY DIVISION

LINDBERG ENGINEERING COMPANY,
2450 West Hubbard Street, Chicago 12, Illinois

2 GREAVES Stars

End milling bayonet lock slot in precision gear hobbing arbor using dividing head on Greaves 2H Universal milling machine.



Greaves 2-H
Plain Milling Machine

★plain
★universal
milling machines

The Stars of the modern milling machine department: Greaves plain and universal milling machines. They're accurate, powerful, with speed and capacity to spare.

Never Temperamental: Greaves milling machines are dependable. You can count on them. They're engineered and built for long, hard 2- and 3-shift operation.

Never Expensive: Greaves milling machines prove you don't have to pay high prices for high quality. Why not prove it to yourself. Mail coupon today for fast facts.

GREAVES MACHINE TOOL CO. CINCINNATI 2, OHIO, U. S. A. ESTABLISHED 1917 DIV. J. A. FAY & EGAN CO

GREAVES MACHINE TOOL CO.
2600 Eastern Avenue
Cincinnati 2, Ohio

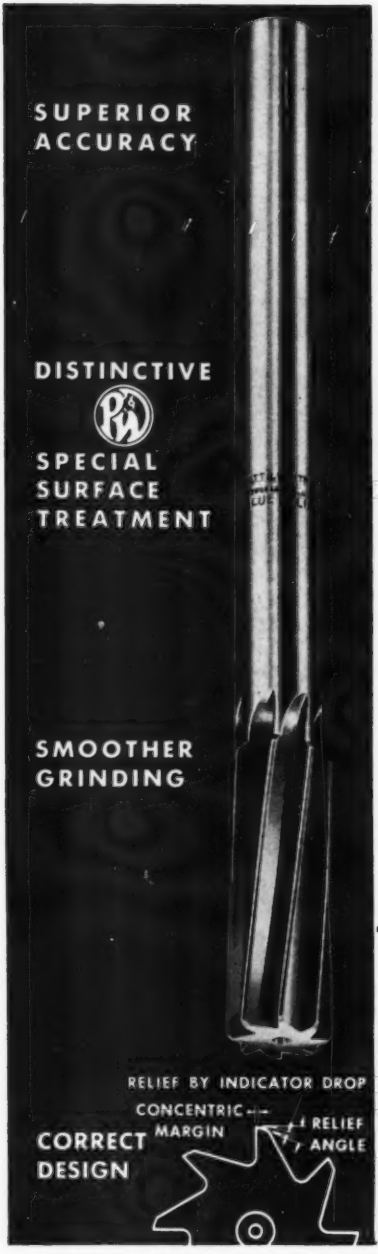
NAME

COMPANY

ADDRESS

CITY ZONE STATE

Please send me chart comparing the 8 leading U.S. milling machines for price, capacity, power and other significant specifications.



MORE SMOOTH ACCURATE HOLES at lower cost

WITH

Blue-Helix REAMERS

From abrasive high-silicon aluminums to high-tensile heat treated alloy steels, Blue-Helix Reamers will do all your jobs better at lower cost. Special P&W surface-hardening and smoother P&W grinding mean greater wear resistance and longer life. Correct design assures fast, free cutting. Shank and cutting diameters and chamfer meet rigidly high standards for both size and concentricity.

Standard diameters (Straight or Taper Shanks) are carried in stock. Special diameters from .0310" to 1.537" (Straight Shanks) and from .222" to 1.537" (Taper Shanks) are promptly finished to order from hardened in-stock blanks. For complete information, use the coupon below to send for P&W Circular No. 563.

PRATT & WHITNEY

DIVISION NILES-BEMENT-POND COMPANY
22 Charter Oak Blvd., West Hartford, Connecticut
Please forward my free copy of Circular No. 563.

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(MTBB-54)

Cut cost with...

VIKING

Designed to meet today's production problems

DUAL THREAD SCREW and WEDGE LOCK are incorporated in our line:

Inserted carbide turning and facing tools, face milling cutters, end milling cutters, shell milling cutters. Inserted HSS and carbide side, half side, and interlocking milling cutters.

HEAT TREATED ALLOY STEEL SERRATED BODY

True dual adjustment of blades with no auxiliary shims, wedges, etc. Cutter can maintain original diameter and width thru life of blades.

After maximum regrinds and repositioning, blades can be "stepped down" and inserted in narrower cutters within same blade thickness series.

Flat, ground face, serrated, inserted blades.

Blades locked and unlocked in cutter body without hammering blade or wedge.

Special Designs of Multiple Cutter Gangs to Customer Specifications.

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VIKING TOOL COMPANY SHELTON, CONN.

Also manufacturers of carbide inserted blade single point tools.

With the Brush SURFINDICATOR, surface roughness measurements can be made on the production line.*

Can this simple check

HELP YOU REDUCE MACHINING COSTS?

The smoother the finish, the higher the machining cost — yet in many plants parts are overfinished because of the lack of proper gaging equipment. For example, if a surface roughness of 125 microinches is specified, and you are finishing to 32 microinches, your machining costs may be as much as twice that actually required for the job.

This expensive overfinishing can be eliminated with the new Brush SURFINDICATOR. It is a practical shop instrument that permits fast accurate measurement of surface roughness on the production line. It is simple to operate, portable, and can save its cost a hundred times over.

Write now for the booklet "Surface Finish Control", which explains how proper surface control can reduce machining costs, increase plant capacity, and improve product performance. Brush Electronics Company, Dept. 1-2, 3405 Perkins Avenue, Cleveland 14, Ohio.

BRUSH ELECTRONICS COMPANY

INDUSTRIAL AND RESEARCH INSTRUMENTS
PIEZO-ELECTRIC MATERIALS • ACOUSTIC DEVICES
MAGNETIC RECORDING EQUIPMENT
ULTRASONIC EQUIPMENT

formerly The Brush Development Co. Brush Electronics Company is an operating unit of Clevite Corporation.

The SURFINDICATOR weighs only 15 pounds, can be set up anywhere in the plant where 115 volts a.c. is available.

*Trade Mark

VALUABLE EQUIPMENT IN ANY SHOP . . .

HEAVY DUTY
CHALLENGE
WORK BENCHES

Challenge Work Bench featuring tool box shelf and steel drawer with lock.

Challenge Work Bench with tool box shelf.

Challenge Work Bench without shelf or drawer.

Whatever your requirements may be — there is a Challenge work bench to meet your needs. Each has a durable cast-iron top two inches thick — will not warp, shrink, splinter or burn. And every one has leveling screws to insure a perfectly level and accurate surface. Legs are strong and solidly braced.

A COMPLETE RANGE OF SIZES AND STYLES

Three styles as shown . . . ***Four*** sizes: (top dimensions) 28x48 and 28x60 with four legs; 28 x 72 and 28 x 84 with six legs. Write for details and prices. 707R

Challenge
TRADE-MARK ®

THE CHALLENGE MACHINERY COMPANY
Office, Factories and Show Room:
GRAND HAVEN, MICHIGAN

Maintain steady production "reduce down time"

With Procunier Tapping Heads

NEW TRU-GRIP tap holder

"There's no trick to it" says management. "It's easy," operators agree. Procunier Tapping Heads are built to last and machined to provide the accuracy and speed so essential to today's speeded up production schedules. Especially so, where quality must be maintained and spoilage and breakage are seriously impairing a profitable operation.

Whether it's light, medium or heavy tapping, for short or *long* periods Procunier Tappers are performing with a new found ease, a more dependable and consistent accuracy and providing many *extra* hours of tapping efficiency. And they're gentle to costly taps too.

Here are just a few "reasons why":

New, sensitive double-cone friction clutch automatically regulates driving pressure with a soft "cushioned" action; simple, one shot lubrication; ballbearing equipped; heat treated gears with special gear reversing mechanism; unique double supported tap holding spindle; lightweight housing; exclusive Tru-Grip Tap holder; plus other important features.

Write for free circular
Giving full details and specifications on the remarkable line of Procunier Tapping Heads.

PROCUNIER SAFETY CHUCK CO.
14 S. Clinton St., Chicago 6, Ill. Dept. 2

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

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Safety Chuck Company
14 S. CLINTON ST. CHICAGO 6, ILL.

TORIT DUST COLLECTORS

Get Close to Their Work to Get Results!

Almost hidden by this thread grinding machine is a Torit No. 64 Dust Collector. Note the minimum of piping and how the dust nozzle nestles just below the work—out of the way yet close enough to capture every dust particle.

Torit Dust Collectors possess many advantages. Compact and self contained they fit in most anywhere, with a minimum of installation expense. Piping losses are reduced and, wired through machine starters, so are power demands. Their rugged construction insures long life and easy maintenance.

Dust Separators

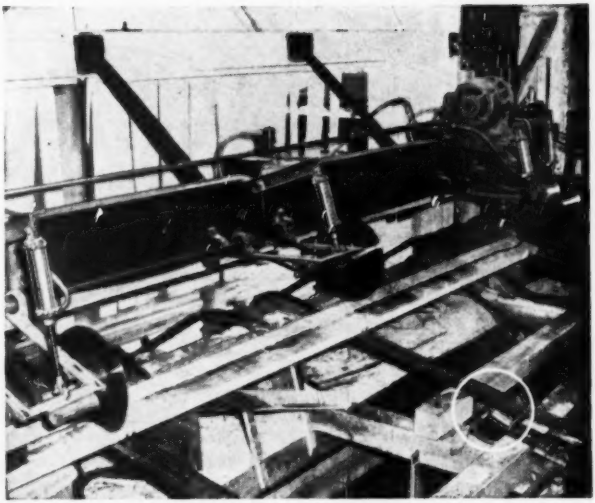
Torit also manufactures a line of cyclone type dust separators. Sizes up to 5 H. P., with or without after filters.

There are Torit Dust Collectors for every standard dust problem, and adaptations for unusual requirements can be quickly designed and fabricated. For complete information and the latest Torit Catalog write:

TORIT **MANUFACTURING COMPANY**

303 WALNUT STREET • ST. PAUL 2, MINN.

Photograph, courtesy of Link-Belt Co., shows NOPAK Model "E" Cylinders used in conjunction with Link-Belt conveyor chains and pillow blocks.



Air Feed for TRIM SAWS with NOPAK Air Cylinders

This 8-saw trimmer installation at Lumber Mills Corp., Ashland, Ore., utilizes NOPAK Model "E" cushioned Air Cylinders to "feed" the saws to the work. As the Link-Belt conveyor chains carry the lumber toward the trim saws, only the two saws which cut the boards to commercial lengths with minimum waste are lowered by the NOPAK Cylinders. The cylinders may be actuated by manually operated or automatic valves.

NOPAK Cylinder, located under conveyor chain, powers flipper arms which transfer boards from preceding conveyor chains at lower right.

This is one of many lumber mill installations employing NOPAK Cylinders to move saws into cutting positions. (Others are shown in the NOPAK Application Manual.) It may suggest similar uses for NOPAK Cylinders and NOPAK Valves in your plant, or in machinery you build for resale.

GALLAND-HENNING MFG. CO., 2754 S. 31ST ST., MILWAUKEE 46, WIS.

For Data and Dimensions refer to Sweet's File for Product Designers, or write for Bulletin SW-1.

•

Representatives in Principal Cities

NOPAK

VALVES AND CYLINDERS

DESIGNED for AIR and HYDRAULIC SERVICE

A 7367-½-I

ARTER *Precision*

ROTARY SURFACE GRINDERS
for Jet and Piston Engine Airplane Parts

THE MODEL "A"

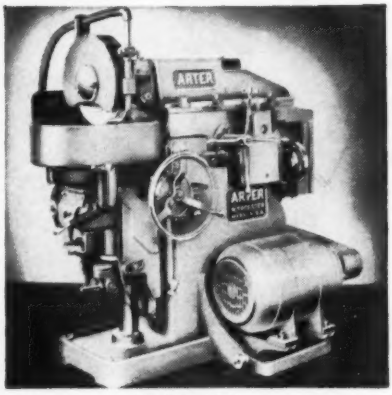
Model "A". Grinding is done on the periphery of the wheel, the work being held by a rotating magnetic chuck. Two sizes: 8" and 12" diameter.

THE MODEL "B"

Model "B". Four chuck capacities — 20", 24", 30" and 40". These machines are mainly hydraulically operated. Great vertical capacity. Work table can be tilted.

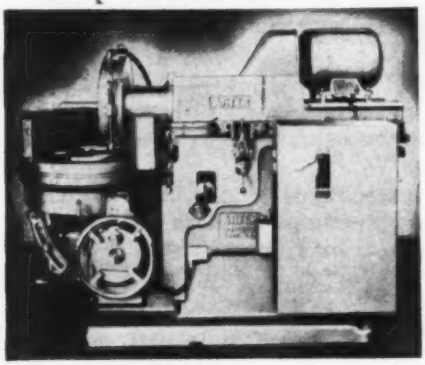
THE MODEL "D"

Model "D" — two chuck capacities — 12" and 16". A 7½ h. p. motor, precision balanced, mounted on the wheel slide delivers full power by multiple vee belts, to the wheel spindle.

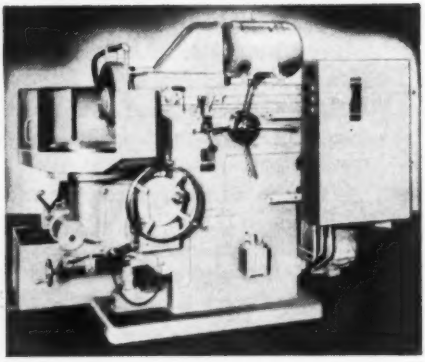


MODEL "A"

MODEL "B"



MODEL "D"



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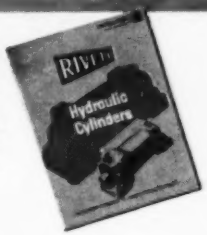
Arter GRINDING MACHINE CO.

WORCESTER 5, MASSACHUSETTS

Rotary Surface Grinders, Cylindrical Grinders, Flat Circular Cutter Grinders, Internal Grinders, Carbide Tool Grinders.

The sweetest story ever told – on AIR and HYDRAULIC POWER!

Hydraulic Cylinder Catalog 106 — Cushioned and non-cushioned, standard rod and 2:1 rod, single and double end rod, internal and external threads, all standard mountings in 2" to 10" bores. Offered for 1500 P.S.I., 3000 P.S.I.



Hydraulic Valve Catalog 204 — 4-way, 3-way, pilot, and remote valves in 6 operations, 4 actions, 7 sizes, 5 piston designs. Offered for 1500 P.S.I., 3000 P.S.I.

These five books, totaling 68 pages, are jam-packed with all the data necessary to lay out successful air and hydraulic circuits. 450 Rivett models, in a variety of sizes, are detailed—every standard air and hydraulic component offered in the industry. Description of each includes working drawings, specifications, and cut-away views. Easy to use, complete in information, these Rivett catalogs are a must on every board. Write to Rivett Lathe & Grinder, Inc., Brighton 35, Boston, Massachusetts.

450 standard Rivett models described!

— All the necessary components for any efficient circuit.

Hydraulic Power Unit Catalog 400 — Single, double and combination pump types. Single — .4 G.P.M. to 40 G. P. M. at 1000 P.S.I. Double — 3.5 G.P.M. to 48 G.P.M. at 1000 P.S.I.

Air Cylinder Catalog 55 — Cushioned and non-cushioned, single and double end rods, internal and external threads, 7 mountings in 1½" to 12" bores. Offered for 150 P.S.I. air and 300 P.S.I. oil services.

Air Valve Catalog 303 — 4-way and 3-way, pilot and remote valves in 5 operations, 5 sizes. Offered for 150 P.S.I. service.

Rivett Lathe & Grinder, Inc., Dept. MTB-2 Brighton 35, Boston, Mass. Please send me: ☐ Hydraulic Cylinder Catalog 106 ☐ Hydraulic Valve Catalog 204 ☐ Hydraulic Power Unit Catalog 400 ☐ Air Cylinder Catalog 55 ☐ Air Valve Catalog 303

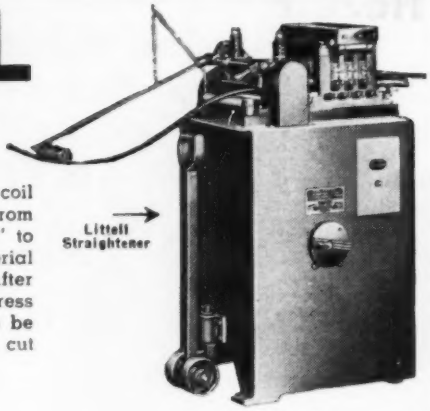
Name _____ Company _____

Address _____ City _____ State _____

RIVETT furnishes a complete power package

VALVES • CYLINDERS • POWER UNITS

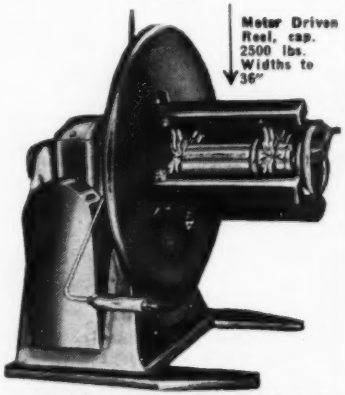
LITTELL
Straighteners



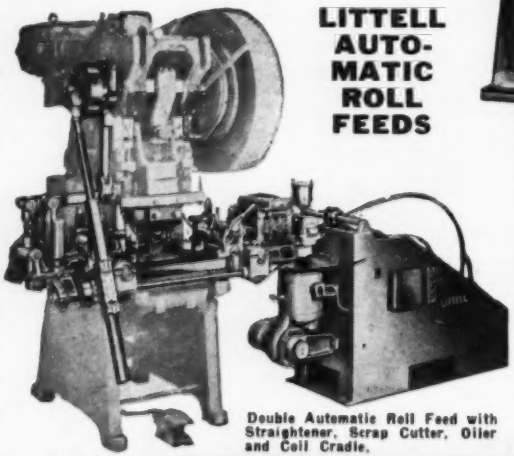
Littell Straightening Machines remove coil curvature from coil stock, thicknesses from .005" to .25", widths from less than 1" to 90". Width, thickness and kind of material determines Straightener needed. After straightening, stock can be fed into press automatically or by hand. It can also be fed into a shear to supply flat stock cut to predetermined lengths.

LITTELL REELS

Littell Automatic Centering Reels are manufactured to handle coils of steel, brass, **copper, bronze** or aluminum from 100 lbs. up to 40,000 lbs.; widths from less than 1" to 90". They are supplied with or without a motor drive for uncoiling stock. Standard arm control regulates uncoiling of stock. Special paddle control made for thick, heavy stock. On all Littell Automatic Centering Type Reels the four arms expand simultaneously and perfectly center the coil.



LITTELL AUTOMATIC ROLL FEEDS



Double Automatic Roll Feed with Straightener, Scrap Cutter, Oiler and Coil Cradle.

Littell standard Roll Feeds are made in widths from 2½" up to 50" to handle stock thickness up to 3/16" and to feed 0" up to 11"—Specials for long feed lengths up to 48". The standard Roll Feed can be mounted on either the open back inclinable or straight sided presses of any make or size. Supplied with a single set of rolls for pushing stock into die or with a double set of rolls for pushing and pulling the stock through the die. Feeds can also be supplied with Straighteners and Scrap Cutters for a variety of stock.

Also Hopper Feeds, Stock Oilers and Stock Tables. Air Blast Valves and Pres-Vac Safety Feeders.

District Offices: DETROIT, CLEVELAND

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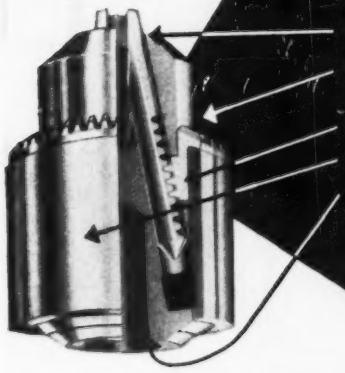
F. J. LITTELL MACHINE CO.
4147 RAVENSWOOD AVE., CHICAGO 13, ILLINOIS

Here are the points . . .



- Jaws Nickel Chrome Moly Alloy Steel
- Key Holes: do not extend into Body Cavity thereby sealing out dirt
- One Piece Geared Nut Construction
- Entire Chuck Body Hardened inside and out
- Taper Bore hardened and ground
- Chucks and Keys interchangeable with other makes

. . . that make

Quality

Supreme Chucks

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Every chuck is individually checked for accuracy . . . you can depend on Supreme Chucks for trouble-free performance and long wear.

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the chuck that lives up to its name . . . SUPREME

Engineers agree that the BEST designs are the SIMPLEST

EFFICIENTLY SIMPLE

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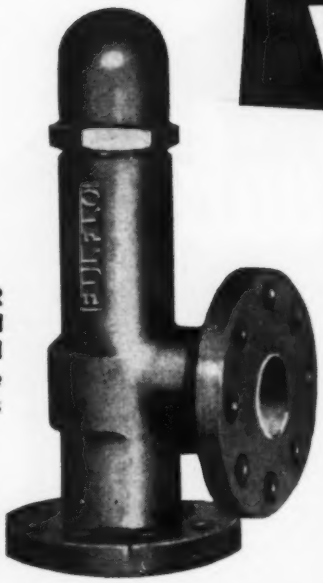


BRASS OR CAST IRON Standard or Flange Types

To maintain specific, predetermined pressures on machine tool hydraulic mechanisms, ram presses, Diesel and oil burning equipment.

NON-CHATTERING . . . NO MAINTENANCE.

for pressures from 0 to 500 lbs. Pipe sizes from ¼" to 2".

WRITE on your letterhead for your personal, professional copy

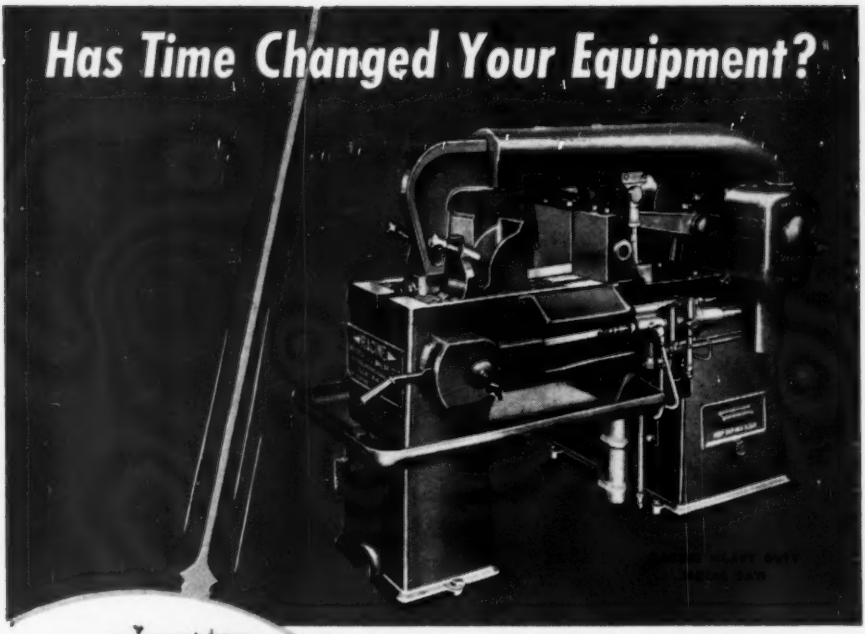
FULFLO MECHANICAL DATA BOOK

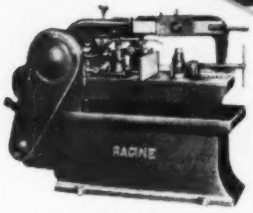
TRADE MARK "FULFLO" REG U S PAT OFF

THE FULFLO SPECIALTIES CO. Inc.

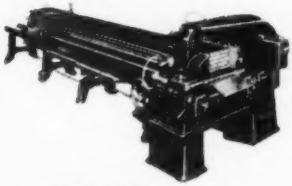
BLANCHESTER, OHIO

Has Time Changed Your Equipment?





RACINE "Utility" METAL SAW



RACINE AUTOMATIC BAR FEED METAL CUTTING MACHINE

Why put up with the inaccuracy and slowness of aged metal cutting equipment. Step up your production, save material, reduce cut-off time and lessen subsequent machinery operations by installing a new modern Racine *all hydraulic* Metal Cutting Saw.

Racine Saws lower costs at the first stage in every metal working job — where the bar or billet is cut to size.

Available in a wide range of models for single purpose high speed or general all-around metal cutting work, and fully automatic bar feed units in sizes 6″ x 6″, to 20″ x 20″.

Don't wait — let us send a competent field engineer now. He will review your work and recommend cost-cutting steps. No obligation. Write for complete descriptive catalog. Address RACINE HYDRAULICS & MACHINERY, INC., 2054 Albert St., Racine, Wisc.

RACINE

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RACINE, WISCONSIN

for more *Accurate* cuts...
greater *Rigidity* in

BORING TOOLS

BORING HEADS
BORING BARS

Use CRITERION

BORING EQUIPMENT

BORING PROBLEMS? CLOSE TOLERANCE?

Try Criterion Boring Tools. Built with the same care and quality as the time-tested Criterion Boring Head.

THIS COMBINATION WILL PRODUCE RESULTS

Boring heads from 1½ to 7 inch diameter. Boring tools carbide or high speed steel, ⅜ to 1¾ inches diameter. Bore holes from ⅛ to 20 inch diameter.

Accuracy for the closest tolerance • Rigidity for the heavy cuts • Heat-treated parts for long wear

LARGE OFFSET SAVES TIME AND TOOL CHANGES

These tools will cut your boring costs.
See the complete line of CRITERION TOOL PRODUCTS at your local dealers or write for free catalog.

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MACHINE WORKS
9312 SANTA MONICA BLVD • BEVERLY HILLS, CALIF.

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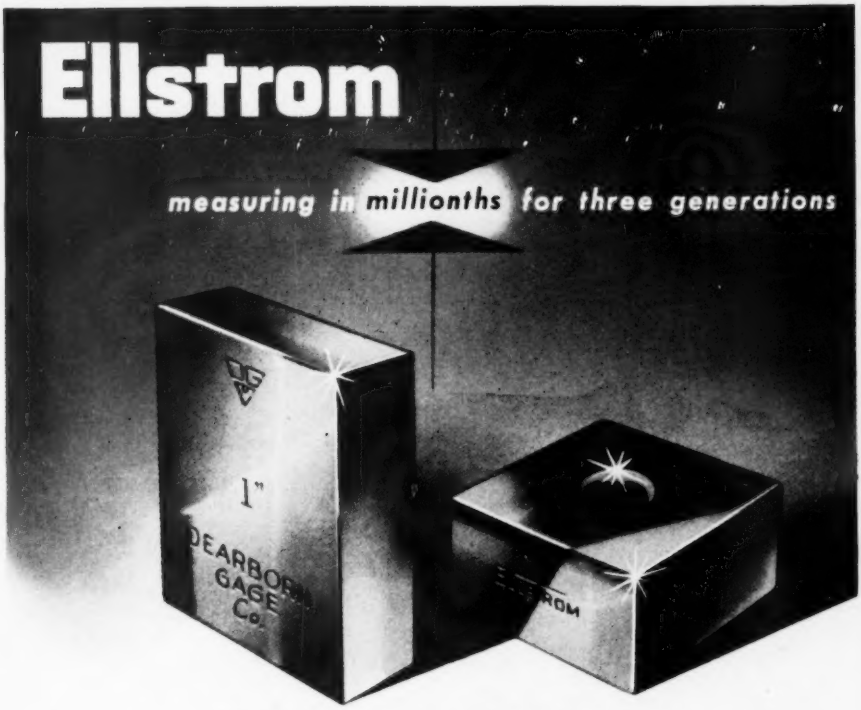
measuring in millionths for three generations



Here are GAGE BLOCKS that invite your most critical inspection!

WE'RE "fussy" about the gage blocks we make. And we hope, when *you* buy a set, that you'll be fussy, too. Because only by your own critical, impartial inspection of each individual block can you come to appreciate the full measure of quality inherent in Ellstrom Standards.

Yes, we'd like you to check any set of Ellstrom Gage Blocks. Check them block-by-block for size . . . for their consistent adherence to closer than specified accuracy. For flatness . . . parallelism . . . and the finish of their hard chromium plated gaging surfaces that give you greater serviceability, longer wearing millionths. And test them, too, for coefficient of expansion and controlled metallurgical stability. Then you'll know why it pays to standardize on Ellstrom Standards!

If You Buy Gage Blocks, send for your copy of this new Ellstrom Standards Catalog. Contains complete specifications and prices on the entire line. Write for it today!

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Dearborn Gage Company • 22035 Beech Street • Dearborn, Michigan

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REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES AND CANADA

10 TIMES THE PRODUCTION LIFE

FROM THESE "CAST-TO-SHAPE" SWAGING DIES

SEND FOR THIS NEW CATALOG
"FORGING AND CASTING PRODUCTS"

It's hot off the press with full details on FCC Air Hardening, Oil Hardening and other Cast-to-Shape Tool Steel Specialties that can save you time and money . . . also Composite Die Sections, and Smooth-Hammered Forgings in a wide range of tool and stainless steels. *Don't wait—get your copy NOW.*

Write Today

ADDRESS DEPT. MB-50

The John Deere Plow Works of Deere & Company formerly used cast grey-iron dies to swage AISI 1070 F steel plow beams. Die life was, at best, a mere six weeks or about 8,000 parts.

They switched to A-L CAST-TO-SHAPE swaging dies of FCC No. 66 tool steel, hardened and drawn to 57-58 Rockwell "C". The new dies ran *fourteen months*—eight hours a day, five days a week—before redressing was necessary. Approximately *83,875 Parts* (over ten times the production) were swaged in that period! Production has been maintained at that level since.

You, too, can save time and money with the modern FCC CAST-TO-SHAPE method of tool and die making. Don't forget, you also buy *less* steel and reduce machining costs. It's a matter worth investigating. ● Check with your A-L representative TODAY . . . or write *Allegheny Ludlum Steel Corporation, Oliver Building Pittsburgh 22, Pennsylvania.*

For complete MODERN Tooling, call

Allegheny Ludlum

AL
FINE TOOL STEELS
SINCE 1854

W&D 4585

Announcing . . .

a New addition to our popular line of SELECTIVE FEEDING DEVICES

NOW! A FEEDING UNIT FOR ALMOST ANY SPECIFIC APPLICATION!

Also **EXTENDED ENGINEERING SERVICE—**

ENABLING US TO DO THE COMPLETE TOOLING FOR YOUR INDIVIDUAL FEEDING OPERATIONS

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DPS BOWL-FEEDER

A proved method based on the VIBRATORY PRINCIPLE. Provides fully automatic, oriented, single line feeding to Grinding, Packaging, Inspecting and many other automatic machines and operations. Will scientifically feed light, fragile parts that normally could not withstand tumbling.

DPS BARREL-FEEDER

For years our popular unit, successfully used in thousands of plants to help speed production and reduce costs. They were designed with the idea of simplicity in operation and maximum feeding, handling a wide variety of parts. Designed for constant operation.

● **Write Us—**
Give Details and learn how our trained engineers can supply the answer to your feeding requirements

DETROIT POWER SCREWDRIVER CO.

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ACCO products

NOW for only $550

(less accessories, F.O.B. Bridgeport)

you can get this J-MODEL WILSON "Rockwell"*

The Best... Costs Less... to Use

• When you use WILSON *"Rockwell"* Hardness Testers to check your products during various stages of manufacture, you will *be sure.* You will prevent costly complaints from your customers. The long experience of WILSON'S Standardizing Laboratory engineers is your assurance of top quality and accuracy in the *"Rockwell"* testers you buy.

SIX IMPORTANT FEATURES

1 Totally enclosed, dirt and dust-proof "Zerominder" dial gauge
2 Gripsel clamp screw for quick change and proper seating of penetrator
3 All controls grouped conveniently
4 Enclosed, easy-to-reach, variable speed dash pot
5 Stainless steel elevating screw
6 Standardized weights

WILSON Makes a Complete Line

There are two types of WILSON *"Rockwell"* Hardness Testers . . . Regular and Superficial. They come in many styles with accessories for testing flats, rods, rounds, and odd shapes. For micro-indentation hardness testing, there is the WILSON TUKON. Write for information.

WILSON "ROCKWELL" and TUKON Hardness Testers

ACCO

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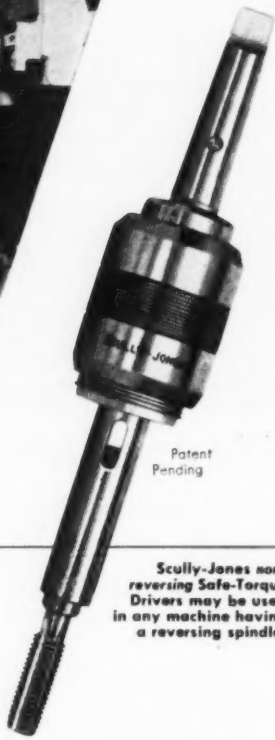
WILSON MECHANICAL INSTRUMENT DIVISION
AMERICAN CHAIN & CABLE

230-T Park Avenue, New York 17, N.Y.

Announcing new tap driver



Scully-Jones *non-reversing* Safe-Torque Drivers may be used in any machine having a reversing spindle!

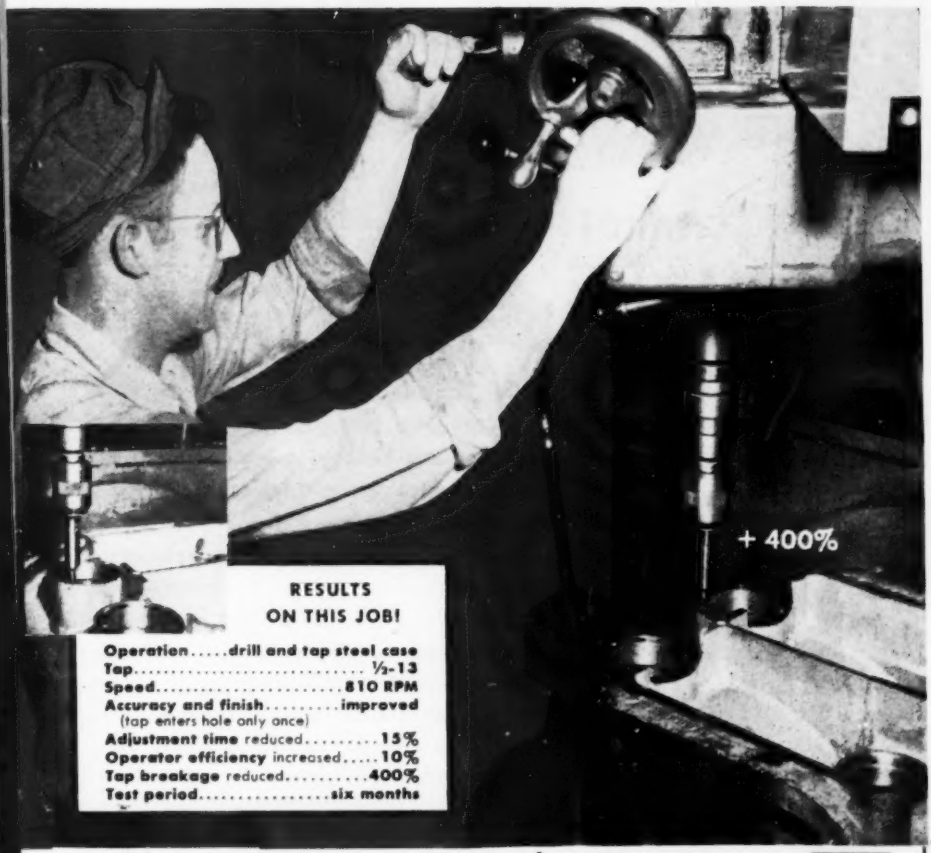
New Scully-Jones Safe-Torque Driver reduces tap breakage 400-500%

Here's the newest development in tapping from Scully-Jones! It's a unique application of the roller-drive principle for tap drivers . . . job-proved at Caterpillar Tractor Co. Tap breakage, scrap and production losses resulting from downtime are now minimized. Adverse machining conditions: hard spots, poor chip removal, inadequate cooling or lubrication, and improper sharpening of taps are under positive control. Overrunning roller drive releases instantly, *without* friction or wear, when torque reaches danger point! Here's one report from "Caterpillar" (illustrated above): "production up 5% . . . improved finish and accuracy . . . 25% cost reduction . . . 10-12% manpower saving . . . *tap breakage reduced* 500%." For details and delivery, contact your Scully-Jones representative or stocking distributor.

BRINGS TAPPING UP TO MODERN MACHINING METHODS

Reduces tap breakage—Releases instantly and completely when torque reaches danger point. Prevents use of dull taps.
Boosts production—Builds operator's confidence in tool. Permits tapping at full speed to full depth. Operates at any speed taps can take.
Helps control quality—Releases when tap is too dull. No objectionable, overriding motion. Helps produce uniform, accurate threads.
Keeps tooling costs low—Five settings provided to adjust torque for various jobs. May be used with standard Scully-Jones Quick-Change Chucks, Turret Tool Holders, Sleeves, Adjustable Adapters, and Tap Chucks.
Saves manpower and material—Dependable control minimizes scrap. Eliminates rework on piece-parts. Reduces downtime.
Makes tapping more versatile—With stop-nut on tap, number of threads may be controlled automatically. Compression spring provides a cushion for bottom-tapping in blind holes without slow-down.
Proved dependability—No overheating or change in torque, even at high overrunning speeds. Human element minimized . . . torque setting not easily changed by operator.

..job-proved at "CATERPILLAR"!



RESULTS ON THIS JOB!

Operation.....drill and tap steel case
Tap..... ½-13
Speed.....810 RPM
Accuracy and finish.....improved
(tap enters hole only once)
Adjustment time reduced.....15%
Operator efficiency increased.....10%
Tap breakage reduced.....400%
Test period.....six months

SCULLY JONES

Precision Holding

FOR HOLDING PRECISION

Scully-Jones and Company
1907 South Rockwell Street, Chicago 8, Illinois

NEW CATALOG!

Write for Bulletin 20-50. Gives you important features, specifications, and field-test reports on Safe-Torque Drivers.

Gentlemen: I'm interested in learning more about Scully-Jones Safe-Torque Tap Drivers.

☐ Please send Bulletin 20-50
☐ Have representative call

Name_____

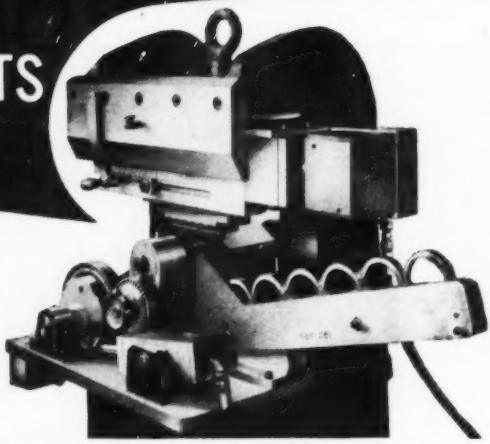
Company_____

Address_____

City_____ State_____

YOU CAN CUT MARKING COSTS WITH...

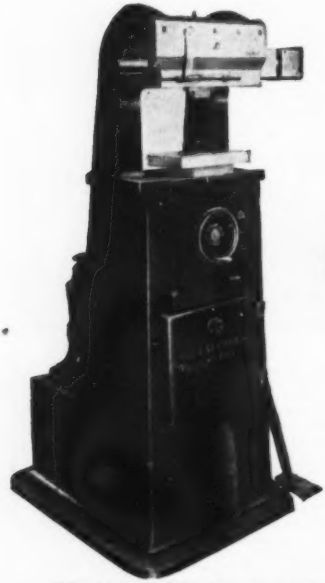
GEO. T. SCHMIDT AUTOMATIC FEEDS



In many applications, thousands of components per hour are marked, with automatic marking equipment. Feeding mechanisms are designed for a specific operation, custom tailored to suit your requirements.

Perhaps specialists can design automatic equipment to solve your marking problems.

A trained marking engineer is at your disposal to help you modernize your marking operations and cut costs to a minimum.



Model 175 Hydraulic

The unit illustrated above marks the perifery of bearing races at the rate of 2400 to 3000 per hour. It is fed directly from automatic screw machines, and requires no operator.

IF IT'S WORTH MAKING, IT'S WORTH MARKING.

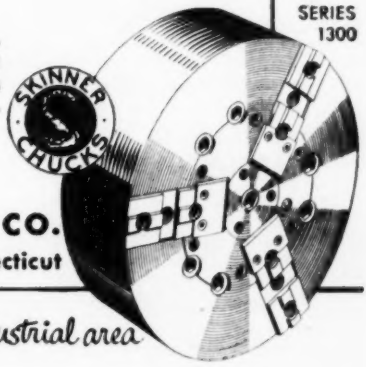
GEO. T. SCHMIDT, INC.
1802 Belle Plaine Avenue
Chicago 13, Illinois

SKINNER

...for every high production need!

Skinner Chucks are available from 6" to 21" with forged steel bodies, and with either 2 or 3 adjustable or non-adjustable jaws. Exclusive sliding wedge construction grips internal or external work positively, and will not release the work, even if air line is broken, until operator actuates draw bar. Double-acting rotating (Series 2100 for speeds up to 1500 R.P.M.) and non-rotating air cylinders are available with semi-steel bodies for all sizes of power chucks, holding fixtures and tailstocks. Series 2200 double-acting rotating air cylinders have aluminum bodies for operation up to 3000 spindle R.P.M. Skinner accessories include hand-operating valves—complete air unit—filters—soft blank top jaws; draw bars—draw tubes, etc.

Write for catalog on the Skinner line of power and manually operated chucks. And ask about movie, "Chucks and Their Use"—available for free showings.



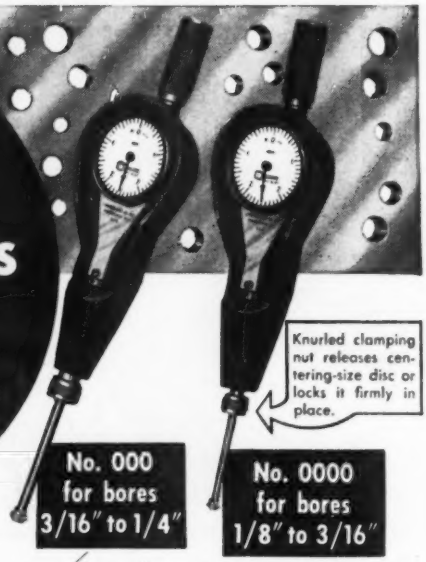
THE SKINNER CHUCK CO.
207 Edgewood Ave., New Britain, Connecticut

Sold by leading distributors in every industrial area

NOW!—DOWN TO 1/8"

Two New Dial Bore Gages

for measuring 1/8" and 3/16" bores

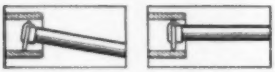

Knurled clamping nut releases centering-size disc or locks it firmly in place.
No. 000 for bores 3/16" to 1/4"
No. 0000 for bores 1/8" to 3/16"

Patent Applied For

These two new STANDARD developments extend the effectiveness of STANDARD Dial Bore Gages to quick, accurate, quantitative inspection of bores down to as small as ⅛" diameter. They utilize the "centering-size disc" principle, tested-in-use with similar but slightly larger gages.

- Hold settings positively
- Give reliable repeat readings
- Sapphire tipped gaging plungers and chrome-plated centering-size disc insure long gaging life
- High visibility dial graduations of .0001 are easy to read
- "Capstan" adjusting disc facilitates adjustment when zeroing instrument.

EASE OF OPERATION



Gage is entered at an angle to allow extended plunger to clear the bore, then rocked to cause plunger to pass a square position while noting minimum reading on the indicator.

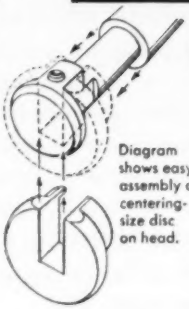


Diagram shows easy assembly of centering-size disc on head.

EASY "SIZE CONVERSION"

Conversion to various sizes in the over-all range of the gage is accomplished by the quick interchange of centering-size discs on the same head simply by turning the knurled clamping nut. Positive interlocking action insures holding set dimension. Centering-size discs are furnished to fit bore dimensions specified by the user, or in complete sets.

AVAILABLE AS ONE-DIMENSION OR FULL-RANGE GAGE

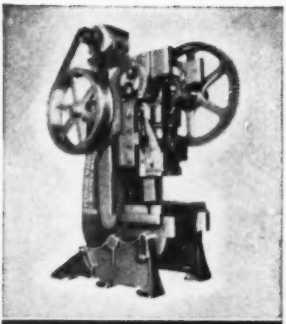
When either gage is supplied with set of discs, any dimension within its over-all range can be measured with a tolerance up to plus or minus .002".

STANDARD Dial Bore Gages now in 10 sizes covering range from ⅛" to 16"

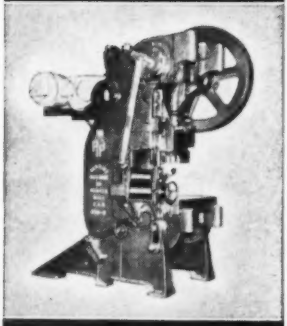
Write for full details

STANDARD Gage Co., Inc.

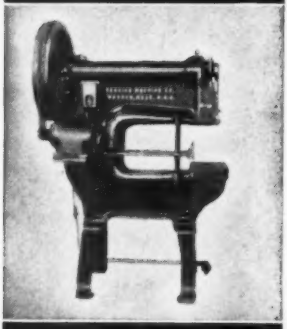
POUGHKEEPSIE, N.Y.



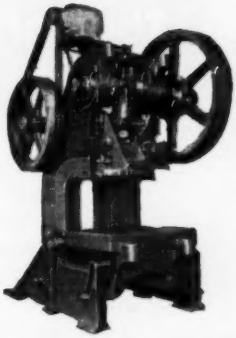
#700 B GEAR PRESS



650-B PLAIN FLY WHEEL

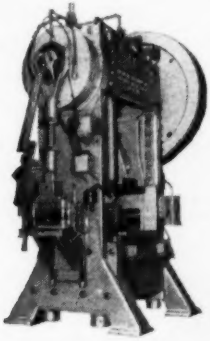


No. 10M FLYWHEEL PRESS



No. 800B GEARED INCLINABLE PRESS

Illustrating a few of the many types and sizes of standard Perkins Presses. Presses built to customers' special specifications.



No. 12-H-36 STRAIGHT SIDE, SINGLE CRANK
TIE-ROD CONSTRUCTION PRESS
CAPACITY 200 TONS

Perkins Power Presses SINCE 1885

PERKINS MACHINE CO.
WARREN, MASSACHUSETTS

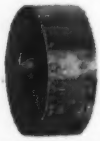
The Land You Build On Requires Marking Devices

When measuring land areas or construction sites, surveyors mark boundaries with stakes or chalk. Working crews then can depend on these marking devices to insure dimensional limits and safeguarding of property rights.

CADILLAC 45
HYDRAULIC MARKING MACHINE

The Perfect Machine for Flat, Round and Contour Marking

PUNCH PRESS DIE
Faithfully reproduces and is particularly adapted to large production marking.



SOLID ROLL DIE
Assuring the utmost in accuracy—used in marking machines, lathes and screw machines.

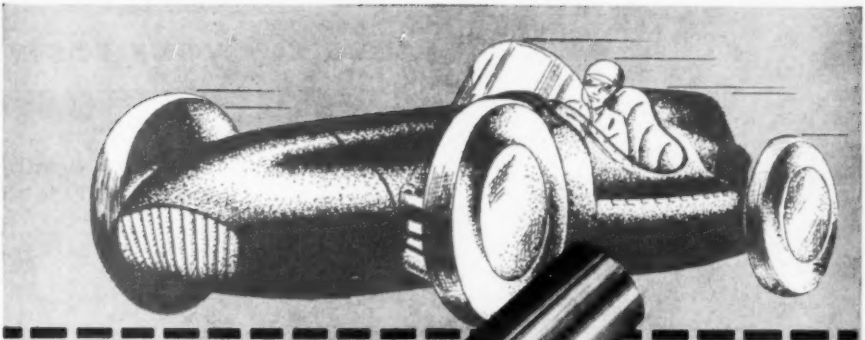
ENGRAVED STEEL SEGMENT DIES
Segment die system ideal for stamping circular and flat work (trademarks, sizes, etc.).

Write for Bulletin SE-130

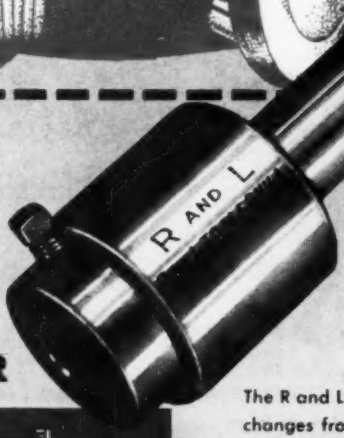
Compact, self-contained and manifold mounted, this machine gives full range of marking depth with one control from extremely shallow impression up to very deep impression. It will mark round, flat and irregular surfaces. Features: repeat action; capacity up to 110 one inch strokes per minute; up to 12,000 lbs. pressure.

For full information, write for Bulletin H-45

CADILLAC STAMP CO.
FACTORY and OFFICES
17321 RYAN ROAD • DETROIT 12, MICH.



R and L TAP AND DIE HOLDER



WHEN SECONDS COUNT

The R and L TAP AND DIE HOLDER readily changes from right to left due to the patented instant release action. It can also be adapted to work on short threads, do bottom tapping, or die up to shoulders.

Releasing or non-releasing, (also furnished for acorn dies), this tool is made in a complete range of sizes from ⅜" diameter shank to 1½" diameter shank.

Fig. 1. Ready to start threading operation.

Fig. 2. Instantly engaged to full contact.

Fig. 3. Fully released. Note ample clearance between contact points of clutch.

RIGHT R and L LEFT TOOLS

1825 BRISTOL STREET • PHILADELPHIA 40, PA.

WHERE R-B Punches cut your costs

IN DIE DESIGNING

. . . you save "board time" by working with the standardized R-B concept of punches, die buttons, punch retainers and die button retainers. R-B standardized equipment reduces drafting time to cut your costs.

IN DIE CONSTRUCTION

. . . you save "building time" because R-B punches, die buttons, punch retainers and die button retainers are furnished completely finished. R-B saves skilled die-maker's time to cut your costs.

IN DIE OPERATION

. . . you save "press time" because R-B punches and die buttons are instantly removed and replacements quickly inserted. Inherent accurate alignment and positive locking keep press down-time at a minimum to cut your costs.

Use R-B Engineering Service for Your Tough Piercing Problems.

RICHARD BROTHERS PUNCH DIVISION
ALLIED PRODUCTS CORPORATION
Dept. 75 • 12621 Burt Rd. • Detroit 23, Michigan

Please send me additional information.

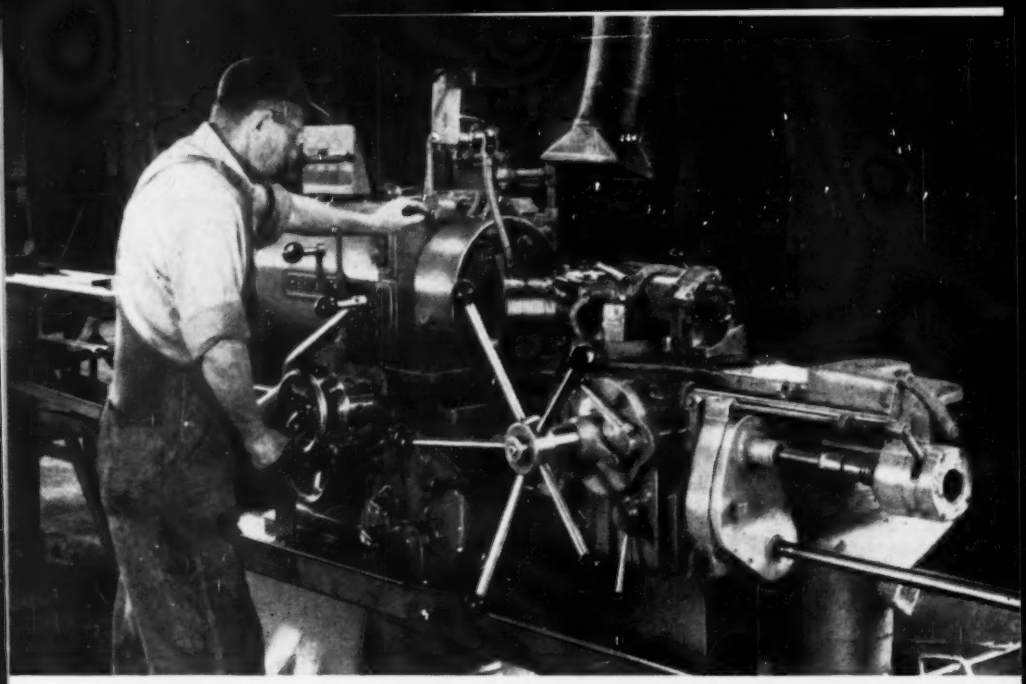
NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Also Produced in
OTHER ALLIED PLANTS
SPECIAL COLD FORGED PARTS
STANDARD CAP SCREWS
PRECISION GROUND PARTS
SHEET METAL DIES MADE OF FERROUS ALLOYS, ZINC ALLOYS OR PLASTICS



MACHINING FOR GOLD at Homestake

with Gisholt Turret Lathes

Yes, gold mining means machinery. And here at the famous Homestake Mine at Lead, South Dakota, Gisholt Turret Lathes help to machine the machines that dig for gold. It's a big job, too—turning out the variety of rock bits and drill rods that are used up in large numbers.

This Gisholt Ram Type Lathe was first used to turn the plain ends on the one-inch quarter-octagon drill steel for two types of rock bits. Production averaged 30 an hour. Now, the machine is also used to machine and thread three sizes of forged steel drill rods. Besides all this, the Gisholt has the job of facing and chamfering the chuck, or shank ends, of the drill steel so that a perfectly flat face is hit by the drill machine tappet.

Here, again, Gisholt Ram Type Turret Lathes prove their easy change-over and ability to produce profitably, even on small runs—big assets in any machine shop. Ask your nearest Gisholt representative about them. Or write us.

GISHOLT MACHINE COMPANY

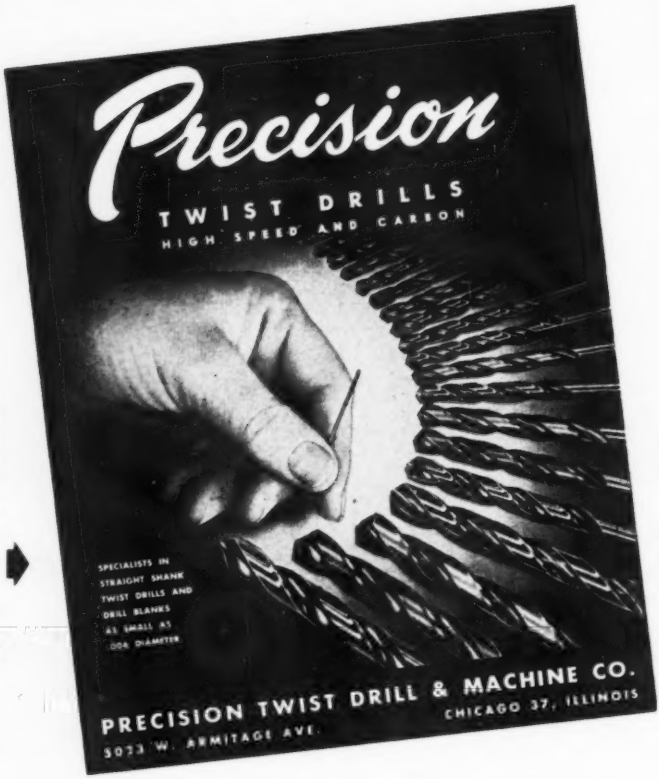
THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

For the Finest Small Twist Drills

Last word in quality small twist drills in regular and longer lengths. Particularly well equipped to supply these longer drills with diameters as small as .006 to Jet air craft manufacturers and others who require very small high quality drills. Also drill blanks. Contact us today.


Precision
TWIST DRILLS
HIGH SPEED AND CARBON
SPECIALISTS IN STRAIGHT SHANK TWIST DRILLS AND DRILL BLANKS AS SMALL AS .006 DIAMETER
PRECISION TWIST DRILL & MACHINE CO.
3023 W. ARMITAGE AVE.
CHICAGO 37, ILLINOIS

Write for this New Catalog and Price List

"Any Precision made drill or tool must not only be entirely satisfactory to you, but must prove to be the most economical you have ever used or it can be returned for full credit."

THIS IS OUR GUARANTEE!

PRECISION TWIST DRILL & MACHINE CO.

WOODSTOCK ST. · CRYSTAL LAKE, ILL.

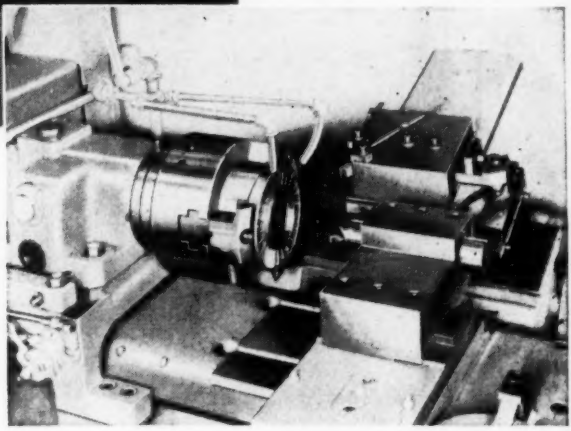
Some Desirable Territories Open for Distribution

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

Left: Several of a group of Lo-swing IMP's used in machining Automatic Transmission Parts.

Below: A close-up view of tooling.



AUTOMATIC TRANSMISSION PARTS MACHINED AUTOMATICALLY ON Lo-swing IMP

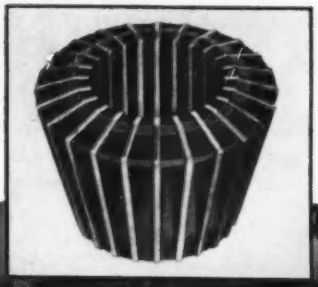
Problem: To bore and face welded Torque Converter Stator Assemblies. Parts must be held without distortion and machined within close limits.

Solution: IMP Automatic Lo-swing Lathes were selected for this work due to ease of operation, high spindle speeds, compactness and rigidity. The upper illustration shows several of a group of machines installed for this class of work. The lower illustration shows one of the lathes, with coolant guard removed, equipped for boring and facing one of the Torque Converter Stator Assemblies. The part is held in a three-jaw, air-operated chuck fitted with wide mushroom type jaws to prevent distortion of the piece. The boring operation is made with two carbide tipped tools mounted in a boring bar and holder and fitted to the front slide. Tool relief is provided on the return stroke. The facing and trimming tools are mounted on a template controlled rear tool block which permits the facing operation to be made at the correct angle. The operation is entirely automatic, the operator simply loads and unloads the parts.

Engineered jobs are our specialty. Our staff is at your disposal to help solve your problems.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swing



Once again!...

Jacobs doubles

production rate

100% faster

Leading chuck manufacturer uses Norton machines to cut grinding time in half

When a leader like The Jacobs Manufacturing Company selects equipment, you can be sure that this equipment has had careful study from every angle of performance and cost.

That's why Jacobs' choice of Norton grinding machines is worth serious consideration when *you* are buying grinding machines.

In producing their famous Rubber-Flex Collets, for example, Jacobs reports that switching from separate operations to a single operation on Norton Type CTU Semiautomatics with multi-wheel mounts has doubled their production rate. *Jacobs reported similar production savings in grinding chuck bodies on the same type of Norton machines.*

Another manufacturer has boosted production from 300 to 600 parts per hour by grinding 2 diameters at once on a Norton machine. Still another reports that a Norton grinding machine with a triple-wheel mount has upped his production rate 128%. Throughout industry, manufacturers are using Norton grinders and lappers to provide the "Touch of Gold" that means time, work and money saved in grinding operations.

The "Touch of Gold" in Your Own Grinding

means the same profit-increasing advantages. And remember: only Norton offers you such long experience in both grinding wheels and machines to assure this "Touch of Gold" that helps you produce more at lower cost.

For further facts, see your Norton Representative, or write us direct. NORTON COMPANY, Machine Division, Worcester 6, Mass. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

To Economize, Modernize with NEW

NORTON

GRINDERS and LAPPERS

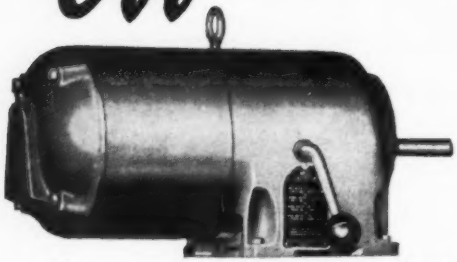
Making better products . . . to make other products better

District Sales Offices: West Hartford • New York (Teterboro, N. J.) • Cleveland • Chicago • Detroit

◀ ***The "Touch of Gold" at Jacobs.*** One of the Norton 6" Type CTU Semiautomatic Grinding Machines used by The Jacobs Manufacturing Company of West Hartford, Connecticut, to grind metal inserts in the famous Rubber-Flex Collets. The basically fast action of this Norton grinder, the multi-wheel mount, special swivel table arrangement and wheel-truing device provide a single setup for traverse and shoulder grinding operations that boosts production rate 100%.

LIMA GEARSHIFT DRIVES

Offer



☆ INCREASED PRODUCTION

☆ GREATER MACHINE FLEXIBILITY

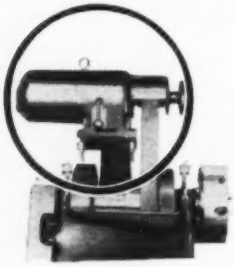
☆ LOWER OPERATING COSTS

If you want to *increase* production and *reduce* operating costs—eliminate obsolete overhead lineshafting!

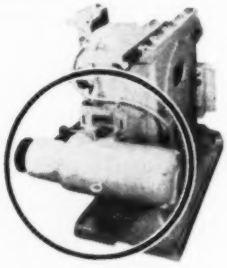
LIMA GEARSHIFT DRIVES have been designed to individually motorize all types of machine tools and production equipment — economically.

Why not let our experienced Sales Engineering Staff help solve your motorizing problems—an accurate survey of your requirements involves no obligation.

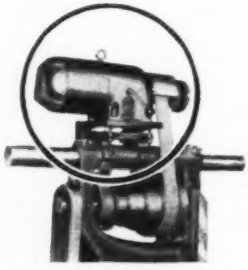
Write today for complete information.



LATHE



SHAPER



MILLING MACHINE

LIMA

Coast To Coast Representation

GEARSHIFT DRIVES & MOTORS

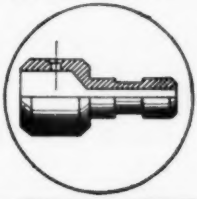
THE LIMA ELECTRIC MOTOR COMPANY 270 Findlay Road • Lima, Ohio.

SNOW

FULL UNIVERSAL MACHINES

Air operated, electrically controlled Snow tools are establishing amazing production records daily on a wide variety of work. Just note these typical examples:

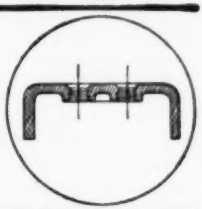
DRILLING



Crossdrill and C"T" Sink 1/16" Hole

Material—Brass
Production—4800 per hour
Fixture—#15 Vertical index
Equipment—#1-UD Drilling Machine

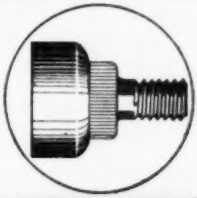
TAPPING



Tap Two #10-32 Holes

Material—Steel stamping
Production—3800 tapped holes per hour
Fixture—#14 horizontal index
Equipment—#1-UT tapping machine

THREADING



3/8"—24 Thread—1/2" Long

Material—Die Cast Aluminum
Production—2500 per hour
Fixture—#10 Drum dial
Equipment—#3-TR Threading machine

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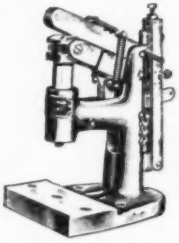

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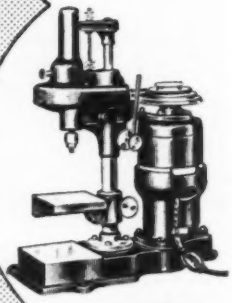

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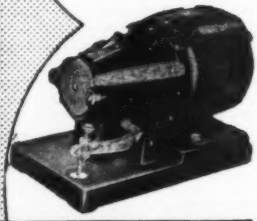

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Featured IN THIS ISSUE

Split Dimensioning and the Use of Templates **151**

Continuous Milling of Squares **204**

Abrasive Action in Surface Grinding **247**

Split Dimensioning and the Use of Templates. by Paul Prikos. The split dimensioning method is gaining wide acceptance in many tool and die shops. The method saves time and cost. The author, who is associated with Prikos & Becker Tool Co., Skokie, Ill., is one of the leading tool and die experts in the Chicago area. Page **151**

New Honeycomb Processing Method. by Frank Charity. It now appears that honeycomb materials can be economically adapted to the fabrication of metal products with virtually all types of design configurations. It is extremely light and possesses considerable mechanical strength. Page **156**

Heavy Duty Floors Help Maintain Rigid Manufacturing Schedules. Industrial floors take a heavy beating under any circumstance, but when the additional damage caused by abrasives and thin steel wheels of carts is added the damage becomes severe. The story of how one abrasive manufacturer is solving his flooring problems is discussed. Page **166**

Three Ways of Setting Lathe Tools on Center, by John Duckworth. While many types of height setting gages are available on the market, the author describes three methods he has found eminently satisfactory in his work. These are by no means the only methods, they merely describe one engineer's procedure. Page **181**

Who Are You Talking To? By Edmund Mottershead. This is another of the Foremanship Forums which have proved so popular. To be a leader a foreman must know how to speak to other workers and to management. He must know how to appeal to them most effectively. A few pointers are given in this article by Mr. Mottershead. Page **189**

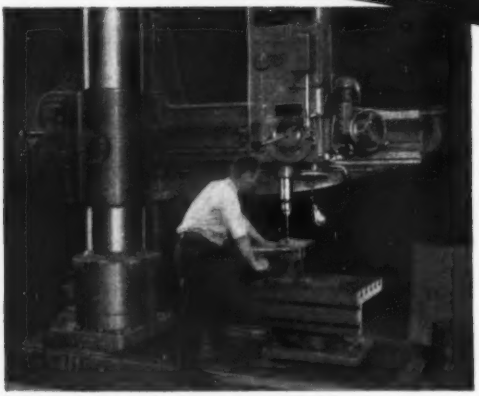
Machining Innovations Expedite Work on Zinc Die Castings, by Herbert Chase. A discussion of how crank handles for the majority of G-M cars are machined by the Ternstedt Division. Some of the operations are interesting. Page **197**

Continuous Milling of Squares, by Tom Brown. Frequently the productions executive must adapt an existing machine to perform a job for which the machine was not designed. Such a case is described here. The author is using a plain horizontal milling machine for the continuous production of square heads on special bolt forms. Page **204**

"Know-How" REFERENCE SHEETS. This month's reference sheets are in the form of a cutting tool clinic which lists the type of trouble, probable cause, and suggestions for correcting trouble when using single point and multiple point tools. Page **216**

Abrasive Action in Surface Grinding, by W. T. McCargo. A highly informative article about the inter-relationships between feed, wheel selection, production, etc., written by one of Carborundum's authorities. Also included in this, the thirty-seventh special report on Grinding Machines, is a description of late model grinding machines, and specifications of American built machines. Page **247**

super service FOR "egg beaters"



Photographs courtesy of the Piasecki Helicopter Corporation.

These Helicopters for Army, Navy and Air Force are being produced to exacting accuracies at the Piasecki Helicopter Corporation at Morton, Pennsylvania. A Cincinnati Bickford Super Service Radial Drill was selected for its accuracy, speed and easy handling as part of a current cost-reduction program used in the jig and fixture department producing tools for the Egg Beaters.

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AS THE *Editor* SEES IT

Price Control in the Machine Tool Industry

. . . sounds like a chilling title to a booklet. One might think it better judgment to give this little creation written by Frederick S. Blackall, pres. and treas., Taft-Peirce Mfg. Co., a wide berth and tackle Terry and The Pirates instead. The title may be forbidding, but the contents makes splendid reading.* While the booklet deals specifically with price control in the machine tool industry the reflections and conclusions of Mr. Blackall give one food for thought.

Several aspects of Mr. Blackall's work struck me forcibly: His lucid style of writing; the magnificent restraint shown in the discussion of governmental interest in the machine tool industry during the Korean conflict; the eminent readability of the work. Usually I approach books on prices, economics, etc., wishing I could be far away on some tropical isle drinking coconut juice; yet Mr. Blackall, Price Controls in the Machine Tool Industry, and I have become fast friends.

The work is divided into five chapters: The industry; history of price control in the industry; weakness of the program; necessity for a price control program (?); conclusions.

Says Mr. Blackall: ". . . the effect of price control programs has been to discourage rather than to encourage the production of producer tools, which, in turn, has had an adverse effect on over-all production.

"Controls do not prevent inflation. In an inflationary situation the pressure on prices is always present. Controls merely restrain this pressure temporarily and postpone the ultimate effect.

"Costs rise but prices do not, and production stops.

". . . rising prices are not the cause of inflation: they are the result.

"An increase, not in production alone, but in productivity—that is, in the units of production per unit of labor—is the best remedy for inflation."

"The control of wages, prices, and production, which has become the accepted expedient to follow whenever an emergency threatens, is at best an attack on the symptoms rather than the disease.

". . . temporary control agencies of the government tend to become entrenched and vested interests in government."

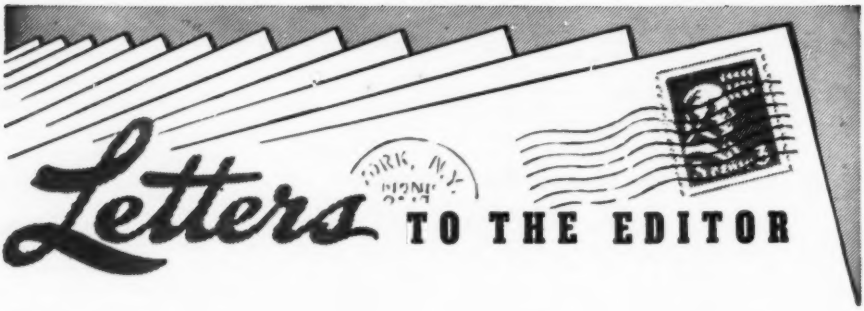
In discussing the governmental regulations covering the machine tool industry (during the middle of 1952 the builder was operating under 16 different price regulations) Mr. Blackall shows marvelous restraint. He is satisfied to say 'confusing,' 'inadequate,' 'lack of consistent thinking.' During this period of 1952 we who do not have Mr. Blackall's precise objectivity and his sagacious maturity, were screaming 'stupid,' 'incompetent,' 'blunderers,' and 'cloth-heads.' The author's use of Jovian understatement is shown in one sentence, in which he sums up the government's attempts to control prices in the machine tool industry.

"It will be evident from the foregoing historical sketches that the attempts to impose price controls on the U. S. machine tool industry, both during World War II and during the Korean defense program, possessed a number of shortcomings."

Shortcomings, indeed!

*Price Control in the Machine Tool Industry, by Frederick S. Blackall, Jr., published by the American Enterprises Association, Inc., 4 East 41st St., New York, N.Y. 56 pages, tables, charts, price 50 cents.

William F. Schleicher



Craftsmanship

May I, through your pages, thank Mr. James H. Smythe for the kind things he said about British craftsmanship in the September issue of your journal. So long as journals print letters of this kind there cannot be very much wrong with Anglo-American relations. Unfortunately, some of us British regard a lot of, so-called, craftsmanship as a pain in the neck and are of the opinion that we have too much of it over here.

Trouble with the craftsman is that he will persist in putting ten dollars' worth of effort into a five dollar job. He will "machine all over" instead of confining his efforts to locating faces. He will resist arc-welded jigs and fixtures because they "don't look right." He will insist on looking back for his standards of workmanship, instead of looking forward. It is a National characteristic of the British to worship that which is old and moss-grown and to believe that a process or method cannot be any good until it has withstood the test of about 50 years of use. We seem to be becoming a nation of prototype builders because we seem to fall down on the job of mass-producing our prototypes.

This pride in craftsmanship is a very great stumbling block to mass production methods since it implies, to the general consuming public, that a thing must be "hand made" in order to claim that it has been made by craftsmen. In fact, the expression "Handmade by British Craftsmen" is used widely with considerable pride by some manufacturers of consumer products. Of course, the product may be untouched by hand during manufacture, but there is no denying that the "hand made" slogan has considerable sales appeal in Britain. Its appeal shows the blind spot in the thinking of the British because it affects the outlook of engineers.

The effect of craftsmanship can, however, be obtained by the exercise of complete control over the product at the drawing stage, coupled with a rigid inspection system. I know that there is a cult or trend of thought in the U.S.A. to try to reduce drafting costs by issuing drawings giving the barest outline of the part. All the British Productivity Teams who have seen this system in the U.S.A. have condemned it roundly and I am in agreement with them. Minutes saved in the drawing office can result in hours of delay and extra work on the shop floor. The delay will be mountainous if the drawings are issued to shop personnel who have not the experience or ability to fill in the information gaps left by the draftsman.

Drawings should be made on the assumption that the reader of them is feeble-minded; they should control the size, shape and finish of the part and indicate the way in which it is to be made. The inspection staff should use the same drawing and should see that the instructions given on it are adhered to. In this way, craftsmanship is taken out of the realm of machining and is placed in the hands of the draftsman who specifies just the right amount of craftsmanship to maintain product quality. We use the

finely detailed manufacturing drawing to keep a reign on the craftsman's time-consuming practices. The drawing can also work the other way round, to ensure that a proper amount of craftsmanship is put into the job.

If the drawings issued to a shop are so bare of information that the gaps must be filled by the knowledge and experience of a craftsman, then draftsman and craftsman should reverse their roles and switch jobs.

Tom Brown, Tool Engineer
London, England

Machining Nickel Alloy Steels

It was with considerable interest that I read Mr. G. P. Witteman's article on "Machining Nickel Alloy Steels" in your October issue.

I would like to emphasize the importance of supplying *all* details of chip breaker design, as the author has done in the table accompanying his figure 4. Too often chip breaker information is incomplete.

May I ask you kindly to send me a back copy to your March issue (the article on page 262, "Grinding Chip Breakers"), your July issue ("Machine SAE 8620 at 1000 SFM on Production Jobs"), and also the report on drills and drill grinding, if still available.

Erik K. Henricksen,
College of Engineering
University of Missouri

Tear sheets of all material requested by Prof. Henricksen have gone forward.

Grinding Reports

We are pleased to acknowledge receipt of the November issue of MACHINE and TOOL BLUE BOOK, carrying a special report on grinding machines.

In the nature of comment, we can only express our appreciation for the exceptionally fine presentation of the subject so far as you have progressed with it. We do not have any suggested improvements which could be made to the presentation of our particular surface grinders. We do, however, wish to express our sincere thanks for the manner in which our line of surface grinders was presented.

Thomas W. Moore, Jr., Vice Pres.
Sanford Manufacturing Corp.

New Studies Show Errors

The writer would like to obtain a copy of the article, "New Studies Show Errors in Many Present Tooling Practices," by Clifford T. Bower, which was the feature article in the October issue of MACHINE and TOOL BLUE BOOK.

This article contains some very valuable information which we would like to circulate among our tool designers and process engineers if you have copies available.

C. C. Hillis, Eng. Dept.
Union Special Machine Co.

Fixtures Expedite Arc Welding

I would appreciate your forwarding as soon as possible four copies of the article "Good Fixtures Expedite Arc Welding of Heavy Assemblies," by William K. Potter, appearing in the August, 1953, issue, pages 155 to 160.

C. A. Heffernon, Mgr. Eng. Service
Linde Air Products Company

We would like to receive 5 copies of the article, "Good Fixtures Expedite Arc Welding of Heavy Assemblies." This article appeared in the August, 1953, issue of MACHINE and TOOL BLUE BOOK.

B. N. Smith,
Mgr. Welding Equipt. Dept.
Woodward, Wight & Co., Ltd.

We notice in your August, 1953, issue, on page 155 an article by Mr. William T. Potter, Gar Wood Industries, on "Good Fixtures Expedite Arc Welding of Heavy Assemblies."

We wondered if tear sheets of this article might be available so that we could get one or two sets.

Merrill F. Yale, Welding Eng.
The Lincoln Electric Company

Tear sheets of the above mentioned articles have been sent with the compliments of the MACHINE and TOOL BLUE BOOK.

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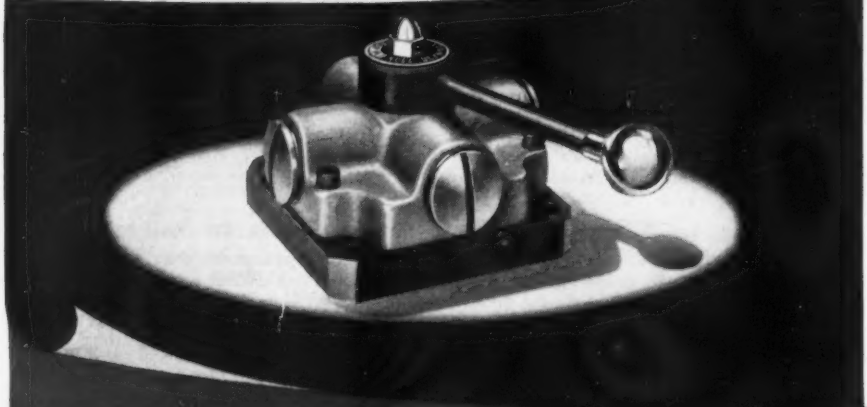

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LAST MINUTE WASHINGTON NEWS

★★★

by Arnold Kruckman

Washington Correspondent

The United States finds it has the greatest difficulty in getting critical metals and materials for the strategic stockpile used in the production of jet planes. The six scarcest on the list, most recently issued, are diamond-grinding wheels, chromium, cobalt, columbium-tantalum, molybdenum and nickel. These materials and metals are used extensively in making jet planes.

Most of the nickel comes from Canada, with the exception of a limited supply which came from Cuba last year. The quantity from Cuba was so small that the Bureau of Mines had no figures covering the volume.

The U. S. is buying 76 critical metals and materials for the strategic stockpile. It has reached its goals only in 23. The 23 are not identified in the list that was issued.

Another interesting comment recently from the Pentagon is the intimation that secret weapons on the drawing board, and those to go on the drawing board in the near future, will call for more machine tools. Apparently there will be need for specially designed types.

At this time of the year the correspondents in Washington get together, either at the National Press Club, or at their other hangouts, not in a formal way, but by groups that have similar interests or are of similar tastes and bents. You'll find many of them in the press gallery of the Senate and the pres gallery of the House, both of which, in a sense, have the effect of the social atmosphere of clubs. And at this time of the year you will find the major discussions revolve around the prospects ahead for the coming year. These discussions are reflected in the news dispatches in your dailies and the comments of the broadcasters on your radios and televisions. What they think, apparently, at this time, is fairly summed up by what follows here.

The idea seems to be that the atmosphere of peace will increasingly prevail and that this atmosphere will have considerable effect on private business because it will gradually shrink the production of military wares. I do not think so.

The general idea among the distributors of news is that we

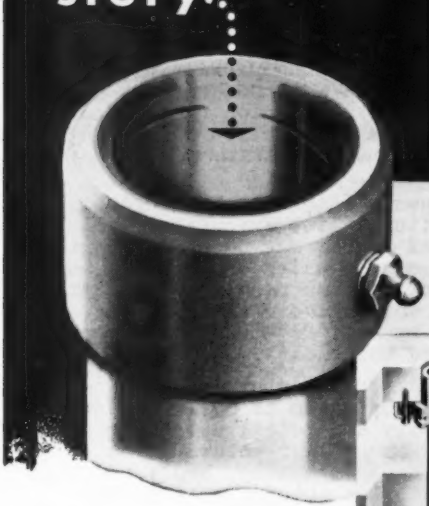
will gradually draw out of Europe, and will decrease our forces in Asia. The extraordinary dislike of the Japanese for Americans, and a similar dislike in varying degrees among other Asiatics, is reflected in the stories that are brought back by official travelers, and by members of Congress who have been in Asia. It follows naturally that this condition leads many of them to feel that Japan will soon build its own defenses, and that Germany will largely be made responsible for its own defense and offense.

The opinion appears to be that draft service will decrease; and that the national security costs, which now constitute 8/10 of the load we carry, should be cut by 3/10 around July 1. The idea seems to be that government, both civil and military, will need to buy less equipment of all kinds.

Most thinking reflects the hope that business will embark on more ventures; that there will be more new business in this country and abroad. And of course Congress is expected to do a great deal towards lowering taxes that have as yet not been discussed. In spite of the fact that huge federal expenses for military, and other equipment, must be met after the year which begins July, 1955, there seems to be anticipation that in some way taxes will be pulled down. Excise taxes of course will be cut on April 1; the corporation tax cut is not expected to go below 52%, although there are some who are hopeful that it will go down to 47%. The social security taxes will unquestionably go up, and there will be more of them. It is anticipated that farm price supports must continue indefinitely.

The impression is that the situation in Korea will stay at checkmate for an indefinite time. This means they think it will be a source of trouble and irritation and uncertainty, and that there will be need for armed personnel indefinitely despite the troops that may be ostentatiously withdrawn. It is anticipated troops that are withdrawn will be quietly replaced without the benefit of publicity. The situation in Indochina is expected to continue as is. We will feed into it military supplies and expert counsellors, but it is regarded as very doubtful that we might send the troops for which the French are clamoring. The idea seems to be that France has plenty of surplus manpower which it might train and send to Asia to do its own fighting, if it wishes to retain Indochina. We are told that we have lost our friends in Indonesia, the new nation for which we are chiefly responsible. It is rather difficult to determine why we should be in that position, because we have been feeding it funds and supplies and expert helpers and doing many things of worth to the Indonesians. But apparently this dislike of Americans, and particularly Americans, seems to prevail in varying degrees throughout Asia. Asia is far more Communistic, according to capitol gossip, than we like to admit. The Asiatic seems to be, by nature, instinct and inherited tendencies, a creature devoted to cooperation. And there is very little difference between the Communism of China and of Russia and the cooperation that prevails in India and other parts of Asia. All these peoples are accustomed to a cooperative system under an autocratic supervision. They tell us the general attitude is that these people with the Communistic spirit are waiting hopefully for us and Europeans to get out.

the BIG difference is an INSIDE story..



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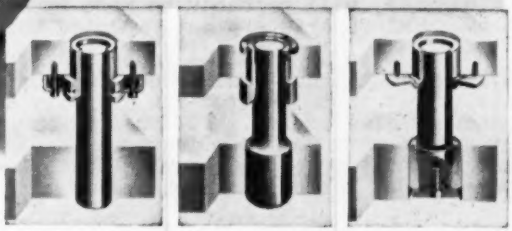

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A recent report, just issued, reveals that when Hoover was President his White House staff totaled 61 persons. Today the White House staff exceeds 1200 persons. The same report shows that the federal government now has 70 huge independent agencies, virtually responsible to no one but themselves. The report urges that at least 40 of them be immediately abolished, and that the other 30 may be gradually eliminated within a few years. It is also recommended that the Labor Department should take over all duties of a number of agencies which have no business except the supervision or administration of some phase of the problems of labor. It is strongly urged that the Labor Department be compelled to abandon its stance as purely the champion of the worker, and that it become neutral, representing government, on behalf of both labor and management. It also again is urged that the civil branch of the Army Engineers be merged with the Reclamation Service and other similar civil engineering services of the government.

Watch for the final report of the Manion Commission on Intergovernmental Relations which is to be given to Congress on March 1. This is the commission headed by Dean Clarence Manion, of Gary, Ind., formerly of Notre Dame. Already it has become known that important recommendations have been made urging a more wholesome division of taxable items between the states and the federal government. It is expected the report will propose officially that even a more clean-cut division of revenue sources be made. This Congress, the 83rd, is loaded with tasks. Even if it were disposed to take on the job it is doubtful whether it could do anything about the Manion recommendations in 1954. So most of the Manion recommendations are expected to go over into the 84th Congress, the one whose complexion will be changed by the elections this year. The 84th Congress comes into existence January, 1955. Some of the Manion recommendations are expected to affect current appropriation bills language, especially grants-in-aid to future state public works programs.

The other commission which keenly interests Washington is the Hoover Commission on organization of the executive branch of the government. This group's final report has been ordered to be made on May 31, 1955. It will start making reports towards the latter part of 1954. It is anticipated reports on federal lending agencies, and other units which have caused a great deal of dispute, will probably be made by next November. Other controversial reports are not expected until early in 1955.

Early in January the Federal Reserve System issued a report stating that industrial production continued to decline moderately, but that construction activity and retail sales were generally increasing. It asserted the dollar volume of construction work put in place, seasonably adjusted, had increased, and that the number of housing units was about even with the period that had recently passed.

It is reported that U.S. Steel Corp. is investing approximately $300 million during 1954 in new equipment and replacements of its production facilities. The report emphasized that during 1953, U.S. Steel alone established an all-time production record of 35,700,000 ingot tons of steel, operating at the average annual rate of 98% of capacity. The heavy demand for

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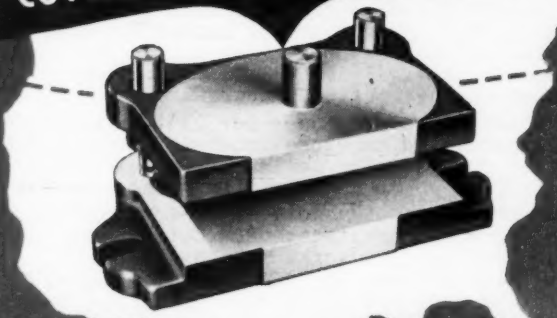

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steel during 1953 stemmed, in part, from a backlog of demands left in the wake of the steel strike of 1952, when some 18 million tons of steel were lost to the economy. A milestone of many years of research was reached in June when the first carload of taconite concentrates was shipped from the Oliver Iron Mining Plant in Minnesota for commercial mill use.

Secretary of Commerce Sinclair Weeks, discussing the outlook for 1954, said: "The American people should have a Happy New Year. The outlook is bright for a high over-all level of jobs and business activity and for an abundance of newer and better products at attractive prices.

"The gross national product for 1953, measuring the market value of all goods and services produced, totaled $367 billion—the highest on record. The national product was 5% larger than that of 1952. The physical volume increased 4%."

In contrast to the foregoing George Meany, AFL president, declared in his New Year statement, that between mid-October and mid-November some 266,000 workers became jobless. He further states that this increase in unemployment will undoubtedly be augmented in the next two or three months, and he predicts that the real weekly earnings of factory workers will gradually decline. Meany does not in any way seem to have faith in the plans of the Administration.

On the other hand, the economists of the Chamber of Commerce of the U. S. A. start their statement in discussing the year ahead with these words: "Among those whose duties require them to look into 1954, there seems to be a consensus that it will be a good year for jobs, for business and for earnings, although it may not be quite as good as 1953 for some lines of business." Then the statement goes on thus: "The super boom is over. The great powerful, somewhat artificial stimuli growing out of World War II and the reconstruction, as well as the Korean expansion, are over. Overly easy inflation (generating credit policy), government pressures to expand plant and equipment, military and defense build-up, and the enormous expansion of incomes which all these together created, all such expansionist factors are behind us. We are now 'on our own,' so to speak.

"In fact, we are in something of a fix. Official Government policy since the Korean attack of June, 1950, has been to (1) fight the war, (2) aid our allies, (3) greatly expand our industrial base and military hardware and other supplies, including stockpiles of raw materials. The aim was to build an industrial base to the point where we could fight a World War III if forced upon us, and yet maintain a civilian economy."

It is interesting to learn that the American Federation of Government Employees demand that the Administration remove military personnel from administrative and white-collar jobs. The officers of the organization insist that full use of civilian personnel in the big military agencies will reduce the need for further job economy among government workers. They assert the proper use of civilian employees in such jobs will make it unnecessary to have any further civilian job cuts in the military bureaus. They maintain that such use of civilians in place of military personnel would save taxes because it costs less to pay a civilian in a job than to equip, pay and maintain

ACME THREADS . . . at Lower Cost

A LANDMACO Threading Machine is today playing an important part in the production of top quality stainless steel valves at The Cooper Alloy Foundry Co. in Hillside, New Jersey.

One operation, illustrated here, involves cutting ¼" pitch ½" lead Acme threads on 1⅝" diameter 304, 316, and 347 stainless steel valve stems. Both thread finish and concentricity are improved over previous threading methods, important factors in meeting the rigid quality standards for "certified" Cooper Alloy valves. IN ADDITION, large production savings are being realized. Each valve stem is threaded with a full 15⅞" thread in 2.5 minutes floor-to-floor time—as against 204 minutes by the previous method. Large savings are also being made in set-up time and in tool cost.

This operation is performed by a 2½" LANDMACO Leadscrew Machine equipped with a 2½" R LANCO Head using roughing and finishing chasers with centering throats. These chasers eliminate the out-of-round condition so common in long workpieces and produce coarse pitch threads of excellent finish in one pass.

Other valve stems, requiring left-hand right-hand, double-start, and single-start threads, are also produced on this same LANDMACO Machine. These threads range from ⅜" to 1⅝" in diameter, and thread forms include both Acme and U. N. Tool cost is low in all of these operations; for example, when producing a ¾" 6 pitch single Acme thread 5⅛" long, an average of 500 pieces are threaded between chaser grinds.

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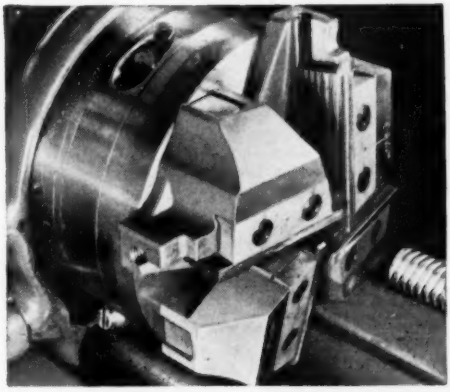

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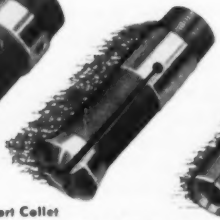

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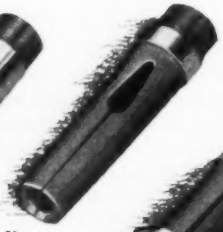

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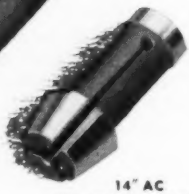

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a military person in any position. A military person must be clothed, fed, housed, provided with medical attention, and supplied with many other services and necessities which the civilian pays out of his own income. In addition, it is felt that certain equipment is regarded essential to the military person which is absolutely unnecessary for the civilian employee.

In a summary of legislative prospects it is considered that the outstanding issues will be the tax programs, the farm program, the amendments to the Taft-Hartley Labor Act, the revamping of the Federal Housing programs, and the expansion of the social security structure. Also, there will be great debate over cuts in defense spending, extension of reciprocal trade programs, and the proposed Bricker Amendment.

A subject for much discussion during this session of Congress is reciprocal trade. This will be seized upon by those who propose that we shall trade, not aid the countries to which we have been pouring our money. And there will be much debate about the power policy of this Administration. It is seriously proposed to sell the TVA to a private corporation. It is obviously very doubtful whether such transaction could be consummated. There are too many political factors entangled in the TVA entity. However, there is every indication that TVA, and some of the other great public power projects, will be stripped of some of the powers and facilities with which they are endowed.

It still is not clear how far the Administration is willing to go in encouraging private corporations to develop public power projects. The Secretary of the Interior has apparently made moves in that direction, but the people who favor the return of the development of power to private corporation are not yet convinced that the effort is entirely genuine. There is also bound to be discussion and legislation offered in connection with the Korean peace conference. It will range from a complete separation from everything connected with the Korean incident to complete support of South Korea, politically, financially and militarily. Finally there is considerable explosiveness in the proposal to force through Universal Military Training. And it is quite possible that someone will propose the repeal of the Sixteenth Amendment (income tax); the 25% tax limitation bill introduced by Representative Ralph Gwinn (R., NY), is still before the Congress, but it is not believed to have a show.

* * *

French production and export of machine tools grew markedly in recent years. In 1938, output ran to 7000 items weighing 26,000 tons, and the industry employed 10,600 persons. In 1952, production increased to 57,700 items, weighing 57,000 tons, and employed 21,350 people.

Commerce Department reports the British machine tool industry has been working at capacity for the past two and one-half years. In the first two months of 1953 machine tools were delivered at the annual rate of $296 million, or 30% above the rate for the same period in 1952. Australia took 16% of UK's machine tool export; Canada, 12%; South Africa, 9%; and the U.S., 8%. In value of exports, presses led, followed in order of importance by miscellaneous lathes, capstan and turret lathes, drilling machines, grinders, automatic lathes and milling machines.

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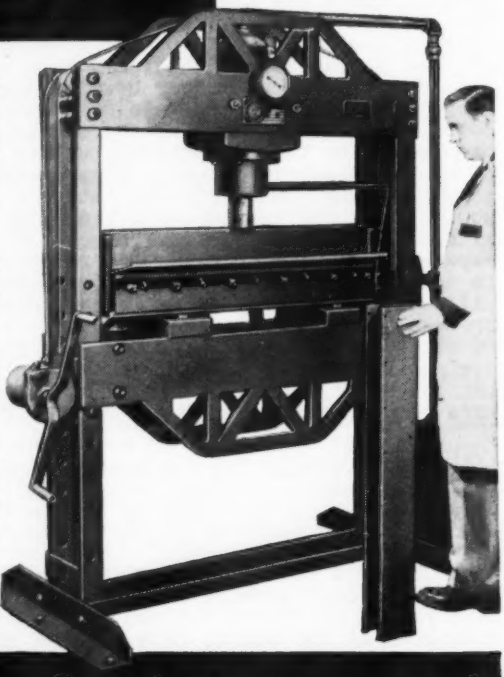
Gross Machinery Inc. of Buffalo, N. Y., makers of dry cleaning equipment, forms all these parts on their KRW Hydraulic press. Each one used to be a slow, inaccurate hand or power brake job.

Gross Machinery originally bought this 75 ton KRW motor driven hydraulic press to form cylinder ribs of 14 gauge steel for their dry cleaning tumblers (second and third from top in photo above). Formerly made by hand, each rib required 12 minutes to form. Now the press does the *same job in 1½ minutes.*

But that was only the beginning. The press soon began poking its nose into every problem in the plant. It gave them a 50% increase in production of filter plates for their tumblers. The lint-collecting drawer (at top in photo above) used to rattle. Gross had almost decided to make these drawers out of heavier gauge, more expensive steel. But then they found that criss-cross ribs formed by their KRW press eliminated the trouble. Brackets for the tumblers, corner inserts for the tumbler hoods, clips for holding wire and tubing on the tumbler — all these jobs are now made faster, more accurately on this versatile KRW press. Earl Westphal, general production superintendent at Gross, says: *"We bought this press late in 1950 and it's paid for itself ten times over."*



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How's BUSINESS ?

Year-End Statements Show Optimism of Detroit Industrialists

Competition, economic production, automation and new industrial developments for the atomic age will feature industrial 1954. These keynotes of the coming year are stressed by a group of Detroit Industrialists. Although specific statements vary according to the fields represented by the spokesmen, stiff competition is a common denominator in all the forecasts.

Broaching machine manufacturers should enjoy a good year because of the stiff competition forecast, according to Arvid Lundell, president of Colonial Broach Co., Detroit.

"Despite strong competition from all quarters, demand for broaching machines should continue firm throughout the coming year," he stated.

"The accent is now on competitive modernization with machine tool customers being primarily interested in the machines that will do the work with the lowest requirements for man-hours and machine-hours."

Demands of the atomic age are going to be felt in 1954, according to another machine tool manufacturer. Oscar L. Bard, president of Michigan Tool Co., said:

"The age in which we are now living is already being called the atomic age. The huge power output of future atomic installations predicates the production of power gear trains capable of transmitting huge loads at high speeds. To the gearing industry, and this includes companies who make gear production equipment as well as those making the gears themselves, this means the production of bigger quantities of precise gearing in large sizes."

W. H. Bibbens, president, Modern Industrial Engineering Co., sees a highly competitive year coming up. His firm manufactures production gear burring and chamfering equipment, pressure testing equipment and special machines.

"We expect that 1954 will be a highly competitive year for us. However, the outlook is very good and business should be as good or better than in the past year," Bibbens stated.

"We expect to do better in 1954,55 said Clyde Mooney, chief executive of Pioneer Engineering and Manufacturing Co. Pioneer is one of the country's largest independent design engineering companies.

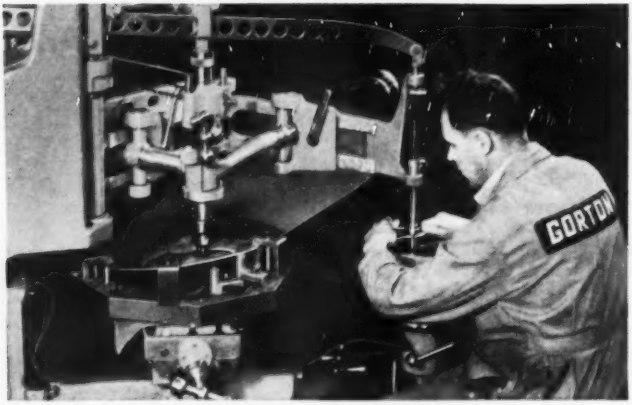
"Industry is tightening its belt to meet increased competition. This means that we will be doing more and more product design and re-design to improve quality and reduce costs," he added.

"The business outlook for industrial pumps in 1954 is similar to that indicated for the machine tool industry," said J. Ralph Griffith, sales manager, Detroit Harvester Company's Pioneer Pump Division. "Pump business," he added, "will be partially sustained by the demand for certain types of machines and equipment which are now scheduled for uninterrupted production through the third and fourth quarters of 1954."

Automation will encourage increased business for marking device manufacturers, according to Carl O. Malmstrom, manager, New Method Steel Stamps, Inc. Malmstrom said:

"Business prospects for the marking device makers in 1954 are very encouraging. Many manufacturing concerns are incorporating these devices in their 'automation' equipment. Automatic marking devices are now being used in many automatic machine tools such as screw and bar machines to eliminate expensive secondary operations. Parts that never have been marked before because of extra handling costs are now being marked automatically."

The United States will continue to need more engineers in 1954 and will have to utilize the available technical talent to its



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best advantage, two executives of national technical societies agreed.

Harry E. Conrad, executive secretary, The American Society of Tool Engineers, Detroit, said:

"Industry's need for engineers, properly trained to do their jobs, will remain a pressing problem in 1954. We need a long-range program directed toward developing an adequate number of trained engineers to assure our country of enough technical skill to cope with the problems of military and civilian production. This program must include provisions for training individuals already employed in manufacturing as well as encompass the regular four-year engineering courses in our universities."

Albert F. Lehmann, president, National Association of Engineering Companies, Detroit, said:

"Competition will be stiff in 1954. Large industries will place more and more reliance on independent design engineering companies to do the rush jobs on special projects in order to keep their own engineering staffs concentrated on the larger projects. Shortage of design engineers will center attention on our member companies where this needed talent can be pooled for the benefit of all industry."

1954 will see plant engineers seeking new ways of reducing fire hazards in industrial plants. The manufacture of cutting fluids for the metalworking industry is one of the fields undergoing research because of the Livonia fire.

"Use of water soluble cutting fluids will increase in 1954. The attention drawn to the danger of fire by the General Motors Livonia disaster is creating emphasis in this field. Decreased basis rates for industrial insurance will probably result. Desire for decreased inventories of 'on hand' stocks of cutting fluids in the plants of individual manufacturers will boost the market for general purpose fluids. Special

---

Industrial Supplies

For the second consecutive month the new order index for industrial supplies and machinery has declined. But the loss is slight—144.8 for November, just 1.2 percentage points below October's 146.0.

The November index of 144.8 is also slightly below last November's 145.9, but is 44.8 per cent above the base month of July 1948.

The index is maintained by the American Supply & Machinery Manufacturers' Association, whose members are suppliers to the manufacturing industries. So the index tends to foretell changes in the industrial production trend.

The recent minor declines parallel a similar falling off in industrial production, as measured by the Federal Reserve index. The August production index was 238. The preliminary figure for October is 231, and the estimate for November is 228, which is seven points under the production index for November 1952.

New Order Index—Industrial Supplies and Machinery

Source: The American Supply & Machinery Manufacturers' Association.

July 1948 = 100

	1948	1949	1950	1951	1952	1953
Jan.		101.5	103.0	223.4		157.4
Feb.		95.8	108.7	239.0		172.9
Mar.		92.7	118.1	220.6		188.2
Apr.		81.6	114.8	206.7		182.1
May		78.6	118.5	183.8		171.1
June		76.4	131.4	Temporarily Discontinued		160.0
July	100.0	68.5	143.1		140.1	155.3
Aug.	113.8	77.9	195.3		128.8	139.6
Sept.	111.3	89.0	187.9		157.9	150.6
Oct.	112.7	91.8	185.6		158.4	146.0
Nov.	107.0	91.6	186.3		145.9	144.8
Dec.	102.9	89.4	184.8		161.1	

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compounds for each operation do not lend themselves to centralized cutting fluid systems which can supply a battery of machine tools in highly automated plants," Larry A Bard, manager, Shear-Speed Chemical Products, Detroit, stated in his forecast for the coming year.

Other Executives Also Optimistic

Speaking for Carrier Corp., Cloud Wampler, president, reported that its sales in all fields of air conditioning and refrigeration, including defense business, rose to about $165 million in fiscal 1953. This compares to 1952 volume of about $108 million, and marked the fourth consecutive year of new sales records for Carrier.

The fastest-growing segment of the industry and that which offers the greatest potential is in year-round air conditioning of homes, the Carrier executive stated. Wampler sees no immediately serious decline in demand.

The United States aluminum industry continued its record-shattering growth during 1953 when it produced about a million and a quarter tons of primary (new) metal —more than in any other year in its history, says I. W. Wilson, president, Aluminum Co. of America.

There is an adjustment now going on throughout business and industry, resulting in a return to more competitive market conditions. During this period Alcoa has maintained a high rate of production. In the coming year there will be greater emphasis on salesmanship.

Alcoa is optimistic about the future. New product developments, new plants, more diversified facilities, increased research activities, increased per capita consumption of aluminum, and a greater national population all contribute to Alcoa's feeling for the future.

Despite stiffer competition for new business, sales of Westinghouse products are expected to reach the highest peak in the company's history in 1954.

Surpassing anticipated record sales of approximately $1.6 billion for 1953, increased 1954 billings will result from the over-all steady growth of the electric utility industry and from greater production made possible by the company's continuing post-war expansion program.

Although most economists have made plausible predictions of a slight decline in over-all business activity from 1953 record levels, industry can anticipate a "good" year in 1954 even in comparison to high-level, post-war performance and a "fabulous" year in terms of pre-war achievement, according to Gwilym A. Price, president, Westinghouse Electric Corp.

The American people should have a happy new year. The outlook is bright for a high over-all level of jobs and business activity and for an abundance of newer and better products at attractive prices, says Sinclair Weeks, secretary of Commerce.

For months business has anticipated temporary adjustments. Many already are over and others will be dealt with as we move ahead. The Administration will continue its policy of encouraging economic stability and growth and of preparing measures for prompt use whenever or wherever required.

Though 1954 may not equal the all-time record boom of 1953, known conditions and foreseeable prospects offer sound reasons for continued realistic optimism that it will be among the better years of economic history.

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Split Dimensioning And the Use of Templates

By **Paul Prikos***
Prikos & Becker Tool Company
Skokie (Chicago), Illinois

THE SPLIT dimensioning drawing method is becoming increasingly popular among progressive tool and die shops, because it produces clarity and accuracy without additional drawing views.

Wherever shops are designing and building dies with split die sections that need finish grinding, the split dimensioning method will prove time and cost saving. Although the method we are describing is used primarily in tool and die design, it will find use in general engineering drawing and design. We have found the idea exceptionally handy in conjunction with standard die and jig boring and jig grinding layouts. In this type of design all dimensions (for the most part) begin from a point of origin located at the upper left hand corner of the plan view, see figure 1-a. This type of dimensioning is especially favorable to die openings in a progressive die that has irregular shapes with many radii, see figure 1-b. Here we open the die block sections, making them separate from each other, yet keeping them in the same plan view. In this way we indicate to the die maker that these sections are later integrated to make a single die block.

The tool designer must be very cautious in his design when splitting irregular openings in sectional dies. One must always bear in mind the tool and die maker's position requiring him to accurately produce the part so designed. In most cases these irregular shapes are ground to size on a surface grinder, and measured by means of a 10-1 or 20-1 layout on the comparator. It means that the area of manipulation

*Mr. Prikos is Consultant Tool and Die Editor of MACHINE and TOOL BLUE BOOK. He is also a member of BLUE BOOK's Editorial Board.

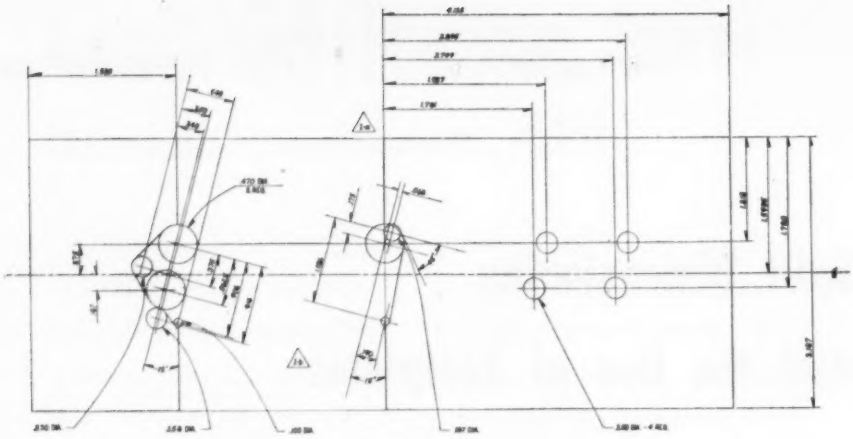


Figure 1.

of the part is limited by the size of the surface grinder and especially the interference of the grinding wheel. To further emphasize this point, a sketch of the two parts, one properly split, the other improperly split, is shown in figure 2. Although this shows a singular cut-through, in many cases more than one split is necessary because of the difficult contour of the die opening. Nonetheless, the same principle can always be applied, namely to help facilitate ease of working a die opening.

If time permits, in the design of dies that have split design applications, it is advisable to show the standard three die views on sheet 1, with over-all tie-in dimensions only. Then on sheet 2, take the plan view and make the regular jig-bore layout with the split sections, spreadout type of layout described thus far. Such dimensioning will cover these important sections in full detail and allow the toolmaker to complete each unit without fear that they will not fit together.

Many times, in making difficult sectional die openings or irregular gage contours, the toolmaker will request engineering to make a 10-1 or 20-1 layout. This is made with standard drawing instruments on vellum paper. However, for more exacting requirements a cellulose acetate (transparent type of flexible plastic) sheet is far superior to vellum. Here the toolmaker mounts the sheet against an angle plate, and working off a surface plate with calibrated instruments, scribes the desired lines to great accuracy.

Consider the following example to illustrate what precision can be accomplished by the above method. Take unity (1.0000) as a typical length or dimension to be produced to within .0003 tolerance. Laying this out with a scale graduated in tenths and at ten to one, we can easily mark off with a pencil to .010 (smallest scale division). Let us presume that during the 10-1 layout we made a pencil error and ended the one inch line not exactly at the ten inch marker but say half way to the next .0-10 mark. This makes the layout really 10.005 long instead of 10.000 long. Hence, the toolmaker will make the part match the layout on the comparator screen. This being 10-1, the reduction in actual error will be .0005 (10 x .0005 equals .005). Now at 20-1

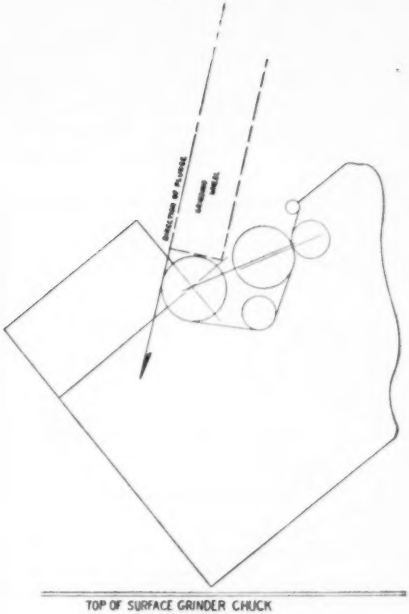


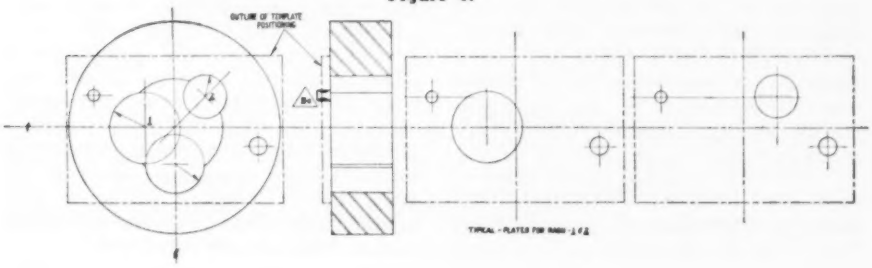
Figure 2.

the actual error is further reduced to .00025; with cellulose acetate sheets, and a vernier height gage, the layout error should not exceed .002. The actual error then at 10-1 becomes .0002, and at 20-1, it is further reduced to .0001. This is extremely accurate for comparator type work.

An extension of the above idea of split dimensioning, and layout work, is the use of templates made either soft or hardened from flat ground steel stock. To illustrate our point, let us say we had to make a part as shown in figure 3. The very nature of this part makes inspection very difficult, let alone the actual building of the tool. Furthermore, the tolerances require a typical jig-bore and jig-grinding process to accomplish the job. The best way to produce this, and similar parts, is to jig-bore two dowel holes at the opposite edges as indicated by figure 3-a. Because the part has three radii, we will proceed to make up three flat ground steel plates with identical dowel hole locations, with the exception that each plate will have a different hole bored with the exact radius (plus .008 approx., grind stock) of one of the piece part radii.

After the preliminary jig-boring and machining is done, the pieces are sent to heat treat for hardening. The reason the plates were also hardened is to give the same grinding effect on two different pieces of metal rather than one soft and one hardened object. After heat treat, the part and plates are ground parallel and then readied for the jig-grinder. We then jig-grind and lap the dowel holes so that the plates and the part will have dowel holes and pins that will be slip fit into each other. We now clamp down the part on the jig-grinder table and indicate it into position, at the same time taking our readings. The first plate is now located on the part by means of the two slip

Figure 3.



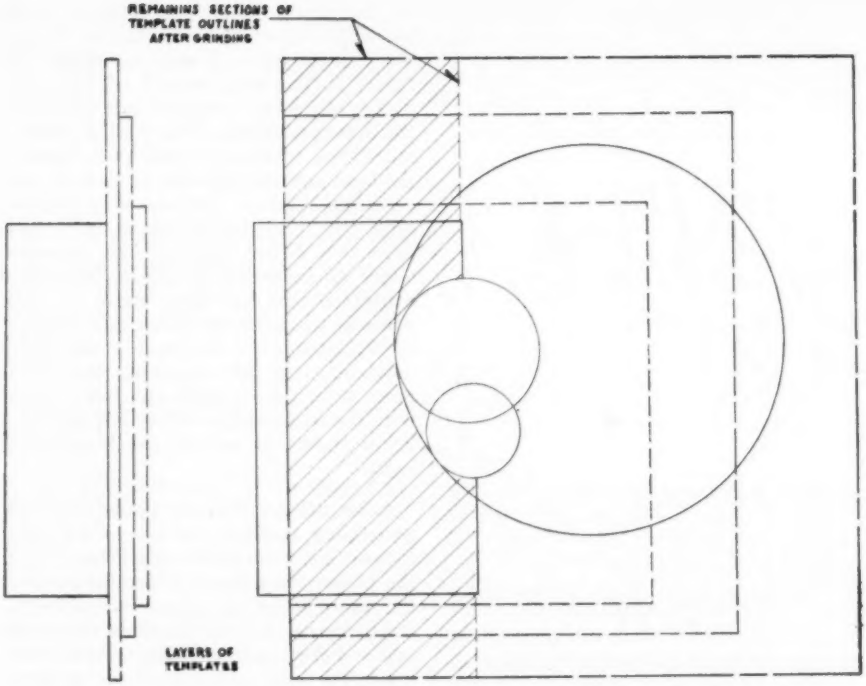


Figure 4.

fit dowel pins. The two are held together carefully with screws or parallel clamps. Proceeding further, the table is positioned according to the drawing dimensions to the point where the hole in the plate is located. The hole need not be indicated because its only purpose is to help determine size. After the first hole is finish ground, we carefully remove the template only, and duplicate this procedure with the remaining two plates. When the job is complete the templates can be turned over to inspection by the toolmaker and the inspector can use them to check the part.

In some designs that require intersecting and blending radii more involved than those shown in figure 1, we can sometimes solve this problem by grinding to a layer of templates. By this is meant that instead of surface grinding (when not adaptable to a jig-grinder or I.D. grinder) to only one template, we grind to two or more at one time. The reasoning being that extreme accuracy prevents us from removing a template for fear that we will not regain the original exact position. Such is possible when, after grinding away a section of the template, the open gap will cause stresses to build up making the template spring out after the clamps are removed. Knowing this as a plausible condition from the beginning we would mount all the necessary templates at once, thereby avoiding any error that could result from the remounting of sprung templates, see figure 5.

The tool engineer who is cognizant of this process would be wise to suggest drawing these plates on the tool drawing and indicate their specific use. This will expedite the procedure should the toolmaker be unfamiliar with the above explained method.

The End.

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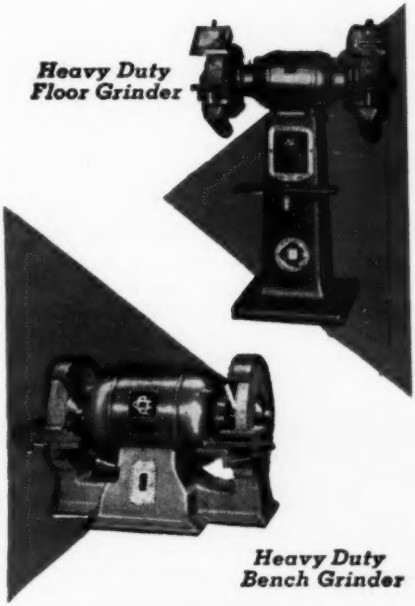

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New Honeycomb Processing Method

By **Frank Charity**

ALTHOUGH they are not new, "honeycomb" materials have to date found fairly few applications in the metalworking field because their usefulness was apparently limited to the production of relatively flat panel-type structures. Now it appears that such materials can be economically adapted to the fabrication of metal products with virtually all types of design configurations by means of a new process recently developed at North American Aviation, Inc., Los Angeles.

Honeycomb materials get their name by virtue of their appearance. They actually comprise strips of materials such as aluminum foil bonded together with high-strength adhesives so that they resemble the structures produced by bees.

In addition to being extremely light in weight, honeycomb structures have considerable mechanical strength and can be used to great advantage where it is necessary to isolate or dampen mechanical vibrations, acoustically insulate a product or part, or minimize thermal conductivity without a sacrifice in terms of weight or structural integrity.

As a rule, honeycomb structures are industrially preferable as "core" materials. For example, lightweight refrigerator panels have been produced by using metal honeycomb as cores or central elements in "sandwiches" with stainless steel sheet facings or outer elements.

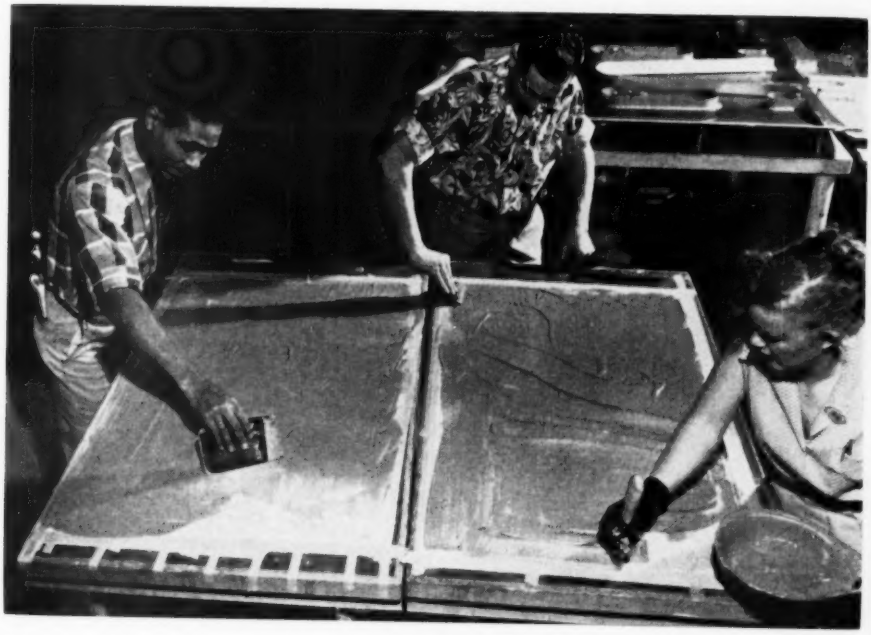
In a completely-enclosed structure, a honeycomb may be nothing more than a loose filler material. However, it is usually desirable to rigidly assemble a honeycomb core and its facing materials in order to attain products or parts with maximum mechanical strength and structural integrity.

Such assembly work normally consists of using high-strength adhesives to bond the core and facing materials. Rivets, bolts, and other metal fittings could be used as assembly media; but, since they would not appreciably increase the strength of most articles with honeycomb cores, aeronautical engineers usually specify "glue assemblies" in order to obtain parts with maximum smoothness—not only for the sake of appearance, but to improve the streamlines (and thus the performance) of modern aircraft.

Parts in which honeycomb cores have been utilized most effectively in the

Cheesecloth-dispersed adhesives are sandwiched between sheet metal facings and honeycomb core materials on a vacuum table, prior to the solidification of the adhesives in a low-temperature oven.

Cheesecloth is impregnated with an Epon adhesive so that it can be used to bond sheet metal facings and honeycomb core materials at North American Aviation, Inc., Los Angeles.



Rivets and external fittings are attached to parts made by adhering honeycomb and sheet metal materials in a more or less conventional manner, as shown here. This particular part is a brake door for a North American fighter.

Close contact between honeycomb cores and facing materials is maintained prior to the solidification of bonding media by covering the assembled components with cellophane so that air can be evacuated from the areas to be adhered. The cellophane-covered materials shown here are ready to be moved into a low-temperature oven (in the background) where the thermosetting adhesives will be cured.

production of airplanes range from doors and fuselage side panels to airfoils such as ailerons, elevators, rudders, and trim tabs.

Raw materials for honeycomb cores are purchased by North American as standardized sheets or slabs which have been tightly compressed so that they could be shipped in a minimum amount of space. These compressed slabs are first cut to predetermined stock lengths and widths, then two ends of each stock segment are attached to metal bars so that the compressed materials can be stretched to full honeycomb dimensions with the chain-pulley device shown in an accompanying illustration.

Next, templates are positioned over the stock segments so that the configurations of different cores or parts can be outlined on the honeycomb materials by a worker making manual use of a sharp knife. Masking tape is subsequently used to outline marks made by the knife in order to minimize the danger that mistakes will be made by a bandsaw operator when the honeycomb materials are finally cut for use as cores.

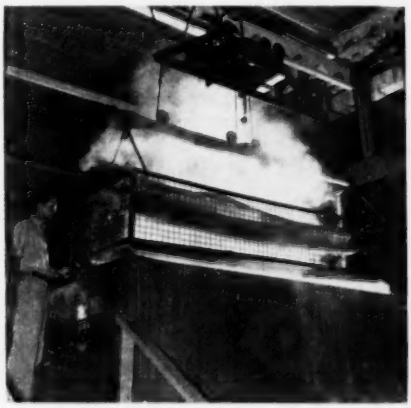
Bandsaw-cut cores are carefully cleaned with detergent solutions of the types commonly used in processing aluminum materials, so that there will be no foreign matter to prevent the proper adhesion of the cores and sheet-metal facing materials.

Following the cleaning operation, the core materials are positioned on table-top fixtures which have scribed lines to indicate the relative positions of the materials.

As shown in an accompanying photograph, the core for a single aircraft part may comprise two or more separately-cut honeycomb segments. These segments are cut from honeycomb materials with varying thicknesses where

A sharp knife is used to outline the contours of a template on a section of stretched honeycomb stock. Masking tape is subsequently placed around the knife-cut lines to facilitate the final cutting of the stock.

Honeycomb core materials are cleaned prior to lamination, since foreign matter could prevent the effective adhesion of sheet metal facings thereon.



Honeycomb core segments, cut from stock with varied thicknesses, are aligned on a tabletop fixture so that they can be faired with a special cutting tool.

Metal bars fastened to the ends of compressed honeycomb materials make it possible to stretch the materials with the chain-pulley setup shown here.

parts with non-uniform thicknesses must be produced. Then, after they are appropriately positioned on tabletop fixtures, the segments are faired with a special saw so that they will have the configuration of the sheet metal parts with which they will be faced.

Cheesecloth, impregnated with a high-strength adhesive known as Epon, is next applied to one side of each facing component. The purpose of the cheesecloth is to retain the viscous adhesive at the point where sheet and honeycomb core surfaces must be bonded without minimizing the strength of the bonds between core and facing materials.

The cloth-covered facings are individually assembled over the core materials on a vacuum table, which is subsequently used to maintain close contact between the surfaces to be mated as the adhesive within the cheesecloth is heat-cured in a low-temperature oven.

An electronic testing device is used by inspection personnel after each fac-

An electronic testing device is used to ascertain the quality of adhesive bonds between sheet metals and honeycomb core materials at North American Aviation, Inc., Los Angeles.

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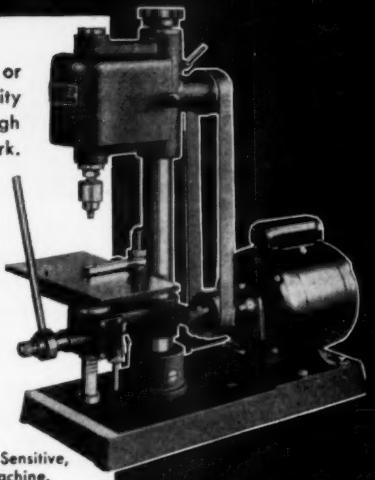

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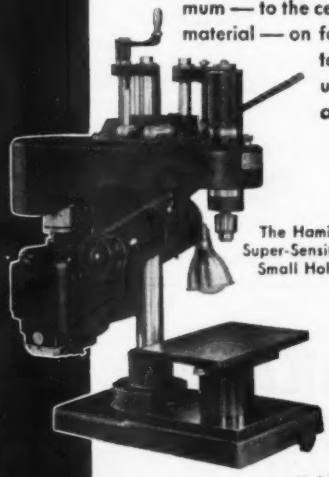

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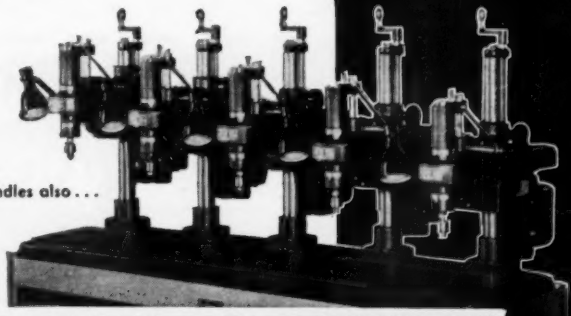

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A honeycomb slab, tightly compressed for shipping purposes, is bandsaw cut to predetermined stock length before it is stretched for use in fabricating a metal core for an aircraft part.

ing component has been adhered to a core in order to ascertain the presence or absence of "air space," existence of which denotes joints of inadequate quality. Then, when sheet facing elements have been applied and tested, the Epon-assembled parts are drilled and riveted or otherwise mated to adjacent structural components in the usual manner.

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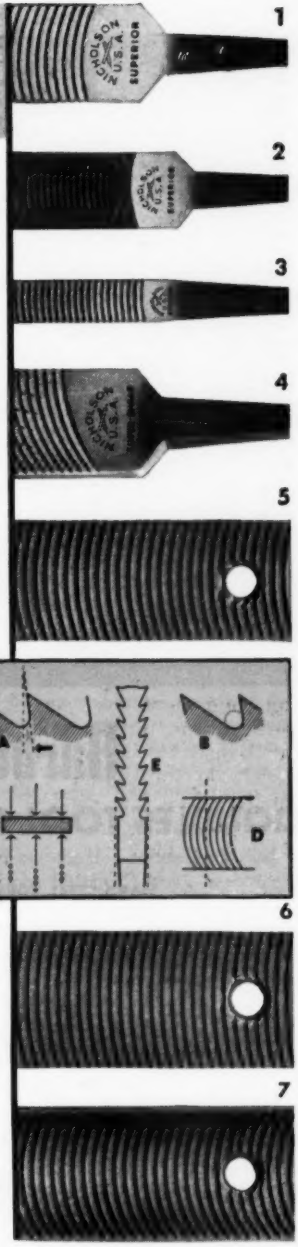

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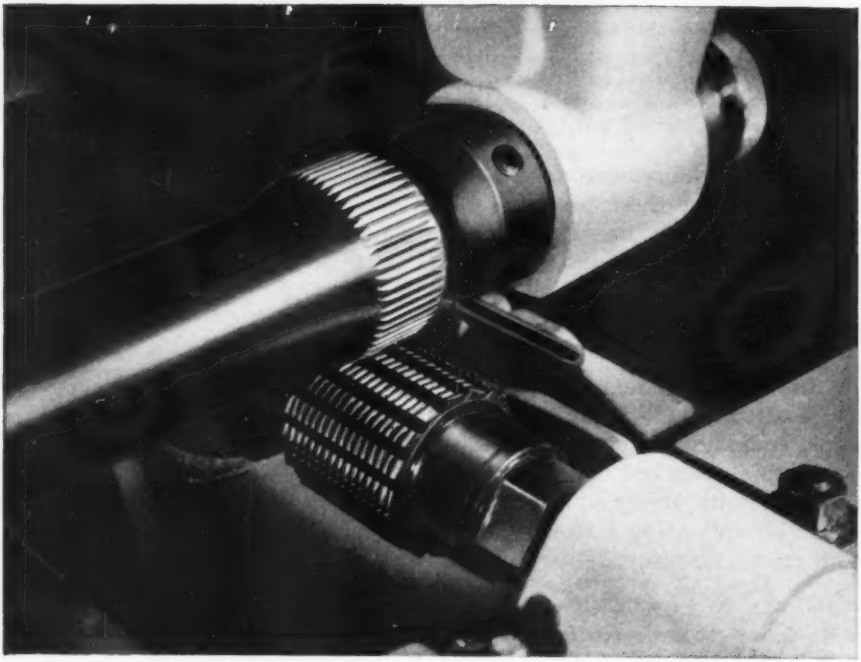

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Hobbing tough, hard materials — such as this torsion bar job — presents no special production problems when you use the Engineered Hobbing approach.

These torsion bars, 45-50 Rockwell "C", approach the upper limit of machineability for hobbing. Structure and toughness of the material caused hob teeth to wear rapidly.

Barber-Colman Hobbing Engineers worked closely with production officials in this plant to produce the desired results on this job. Substantial tool savings, increased tool life, and better production time resulted. Total hob life has increased from approximately 600 to over 1200 ends.

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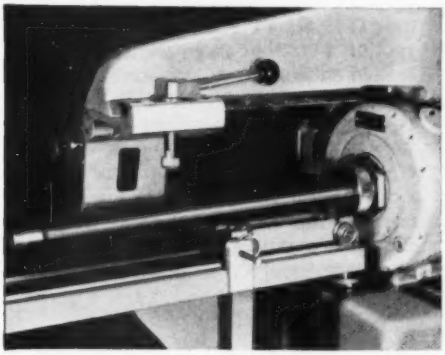
Barber-Colman engineers recommended 4-thread Class C Accurate Unground Hobs and automatic hob shifting to increase tool life and production in this hard material. Results showed an average increase from 65 to 120 hobbed ends per hob sharpening. The use of unground hobs has reduced tool cost considerably. Cutting time is 5 minutes per end, the length of cut being 1⅛".

The form on the hob is a 48° 44′ pressure angle serration with a full radius at the top of the tooth. The hob is non-topping. Climb hobbing allows the hob tooth to start its cut in metal which has had no opportunity to be work hardened.

COMBINED ENGINEERING OF HOBS, TOOLING AND MACHINES PRODUCES BENEFITS



Results obtained on this hobbing job show the benefits possible when hobs, machines and tooling are combined through proper engineering to meet the specific problems of the job.

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Heavy Duty Floors Help Maintain Rigid Manufacturing Schedules

FOR A TIME, Behr-Manning was having trouble with some of its floors. Despite the best efforts of the personnel under Henry C. Nelson, plant maintenance engineer, interruptions in production became too frequent. Movement of materials handling equipment was slowed down. Excessive man-hours were spent patching and resurfacing, and the cost of materials ran high. Increased production demands added to the woes. In addition, the home plant was to be enlarged. So Mr. John O. Amstuz, Behr-Manning's vice-president and chief plant engineer, together with Mr. Shirley, ass't. chief engineer, and Mr. Nelson, gave the floor maintenance problem serious study.

First, the three men made a detailed analysis of floor inadequacies, and outlined the hazards a floor must cope with in the plant:

To begin with, the **product** itself—coated abrasives—varying in grade from rough to fine and in hardness from Flint, Emery and Garnet, through Aluminum Oxide and Silicon Carbide, find a resting place on the floor.

Second, the **plant traffic:** Fork lift trucks, gasoline and electric powered tractors, hand trucks and trailers move over the floors constantly. Tractors pulling a train of up to six trailers, each loaded with one or two jumbo rolls of semi-finished goods (900 lb. abrasive rolls) wage a never-ending war of attrition on the surface. Thus, a 3,000 lb. tractor pulling a train of six 500 lb. trailers, each loaded with 12 jumbo rolls, is a 7½ ton hazard pounding over the floor and grinding down on the residual abrasive.

Then, too, the small diameter steel truck wheels wore progressively deeper, eventually grinding through the concrete to the subway grating used for reinforcing. Floor surfaces became bumpy, causing the heavily loaded trailers to sway. Danger of heavy jumbos toppling off was always present. Even trucks loaded with finished packaged materials swayed and their loads fell off.

The steady pounding of punch and multiple gang presses is another dynamic load which tends to break the

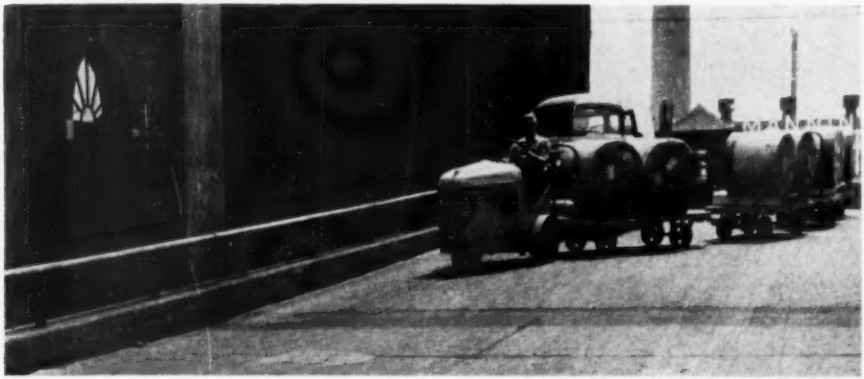
1. Deteriorated sections of floors and view of part of the steel wheel materials handling equipment which caused the erosion.

bond between the surface topping and the concrete underslab. Here again, production suffered, maintenance costs ran high and morale dipped.

Plant maintenance could not solve all the problems. The heavy loads of the jumbos and the tractor-trailer trains had to be maintained. Small diameter steel wheels are gradually being replaced with rubber wheels, helping the floors but making the tractors' job harder. Impact loading on the presses would remain high. The floors could not be hosed down because of the danger of wetting the adhesives. The most conscientious brooming, about the only other preventive maintenance possible, did not remove the residual abrasive. Messrs. Amstuz, Shirley and Nelson concluded that there were no other steps they could take which would materially reduce the hazards or increase the effectiveness of the maintenance procedures. The floor itself must provide the answer.

When plans were drawn for a new, four-story building 99,000 square feet, a Kalman floor was specified for each

2. A seven and a half ton load of jumbo rolls on trailers pulled by a tractor about to enter Plant 1.

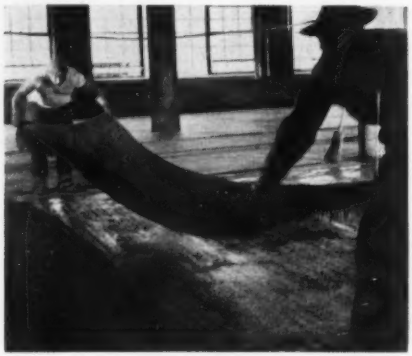


3. First step in laying the floor at Behr-Manning was brushing the excess water off saturated concrete underslab which was kept wet down overnight. Following this a grout coat of pure cement was brushed in thoroughly to increase the adhesive effect of the topping.

of the four floors. This type of floor is a separate wearing course bonded securely to the base slab and it had proved itself in other plants where severe conditions had to be endured. At the same time Kalman was asked to resurface a sample stretch leading to the new building, a traffic focal point subjected to all the demands of the Behr-Manning operation except that of the multiple gang presses and the punch presses. At this point tractor-trailer trains loaded with huge jumbos, hand trucks and fork lift trucks loaded with raw materials and refuse, trailer trucks bringing in large, heavy drums of resins for adhesives and all types of traffic converge. A down-grade leading to the stretch created an added hazard of heavy equipment rolling down and hitting the area with excessive impact. Elevators located nearby intensified the convergence of traffic even more. Floor performance and durability in this criti-

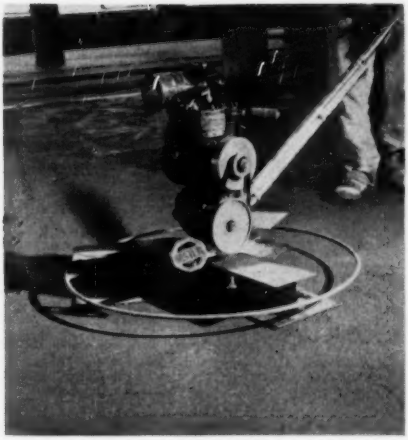
4. After the mix has been poured it is screeded to true level. Ends of the screed rest on forms ⅜" above the underslab.

5. After screeding, the burlap blotters are placed down over the wet mix.



6. Ten to thirty minutes later, the burlap covered with cement is raised. At this point the embryonic floor can support the weight of a man.

7. First step in the finishing processes is compacting by means of heavy, mechanical floats which densify the topping further.



8. Next step in finishing is several runs over the entire surface with mechanical trowels.

cal area will be closely observed by Behr-Manning plant engineers as a key to future floor specifications.

The Kalman company feels certain that these installations will successfully meet the severe demands at Behr-Manning. The "absorption process" which they use is said to produce the tough and hard concrete surfaces. Absorption process means the control of the water-cement ratio to bring about full hydration of each cement particle so that each will achieve the optimum in binding strength.

The water, cement, sand and trap rock comprising the aggregate are mixed to formula. The concrete underslab is wire-brushed to remove all laitance and scum, saturated and kept wet-down overnight. Before pouring the mix, a grout coat of pure cement is brushed in thoroughly to increase adhesion. The mix is then poured and screeded to true level. At this point the absorption process begins. The freshly screeded section is covered with clean burlap, then covered with pure cement. This acts as a "blotter" to absorb excess water, thus

9. Hand finishers moving over surface just subjected to the final run by mechanical trowels.

holding the hard trap rock aggregate in position throughout the mass. Fine matter does not rise to the top, where it would wear readily and dust. If the mix had been put down originally with a low water content, the cement particles would not have hydrated completely, their binding qualities would be severely inhibited and weaker concrete would result.

Ten to thirty minutes later, depending on conditions, the burlap blotters are removed and the floor is ready for the finishing operations. Even at this point, the floor can support the weight of a man. The floor is then floated, machine troweled and hand troweled. Again, depending on conditions, the hand troweling may go on continuously throughout the evening hours.

The finished floor is covered with paper and kept saturated for ten days to two weeks, a period during which only pedestrian traffic is permitted.

The resultant floor is designed for long life, requiring only the simplest maintenance procedures such as brooming and ordinary good plant housekeeping rules. The toughness of the surface and the extreme density resist the heaviest poundings and sustained traffic.

The End

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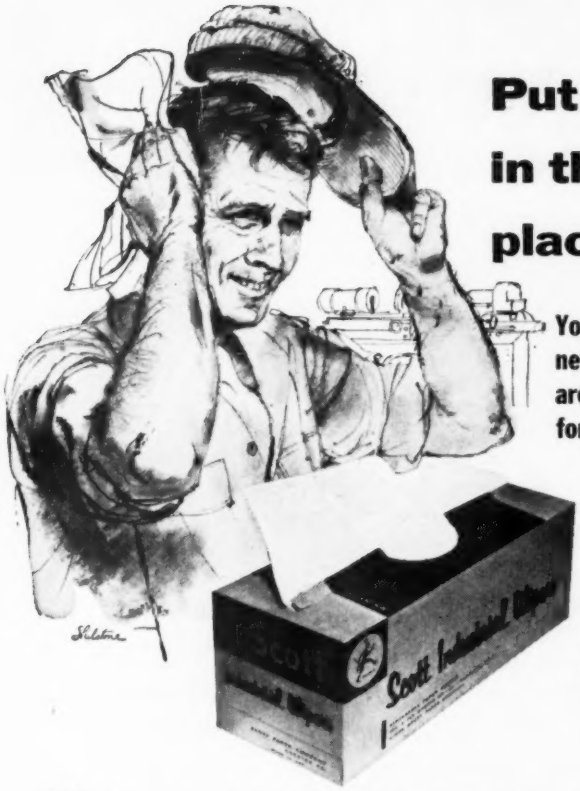

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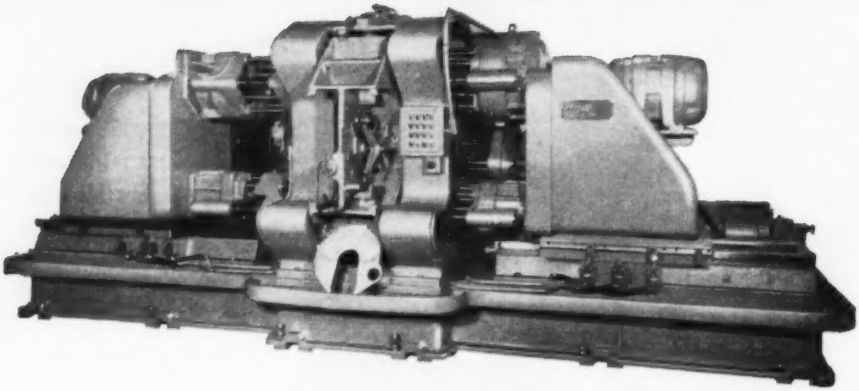

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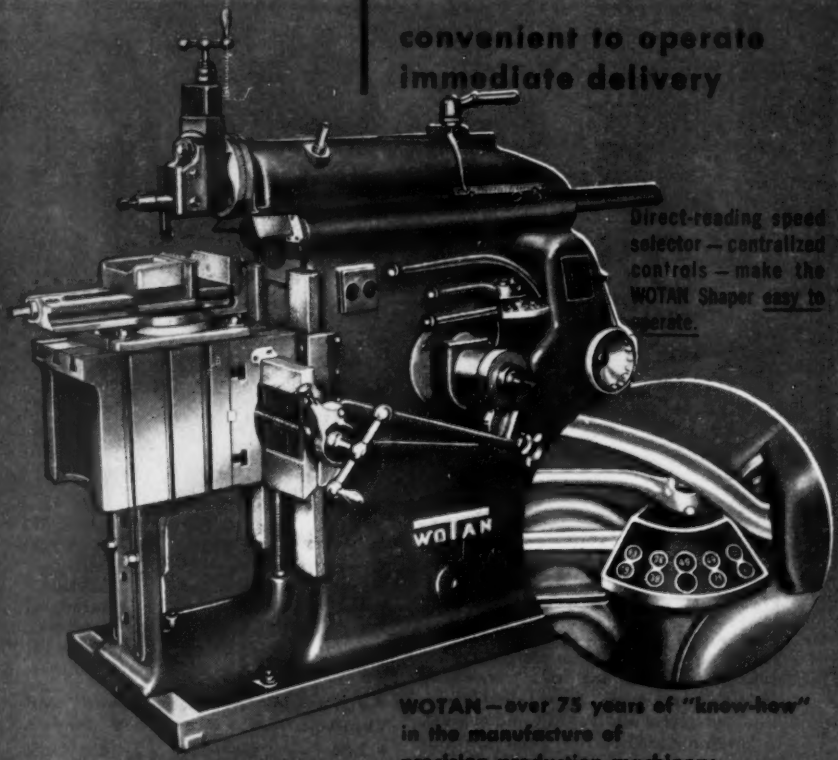

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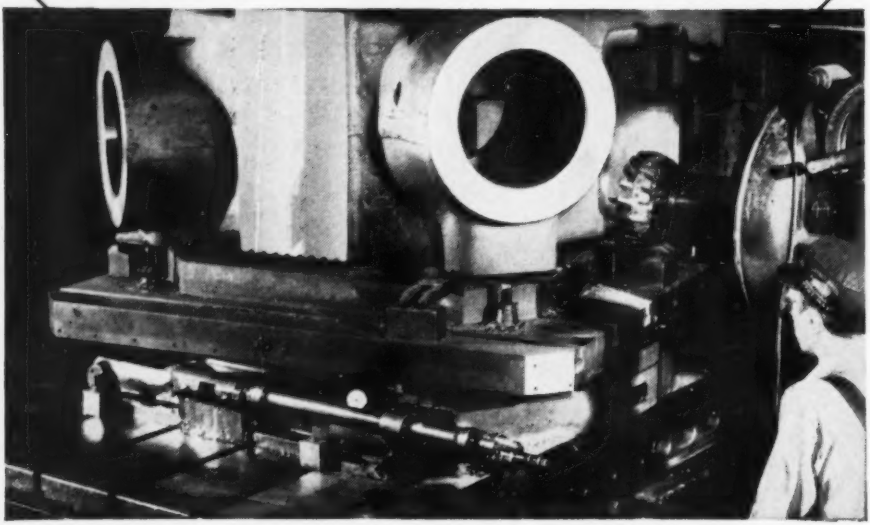

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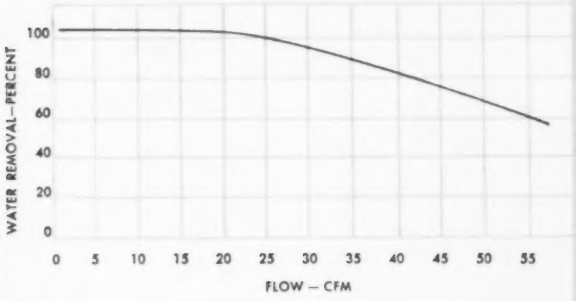

operates whether air pressure is constant or fluctuating, whether or not air is flowing.

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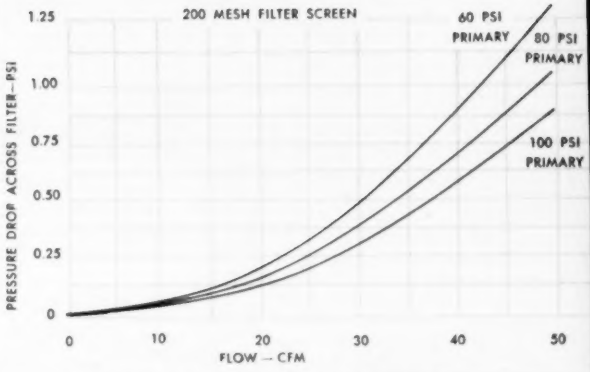

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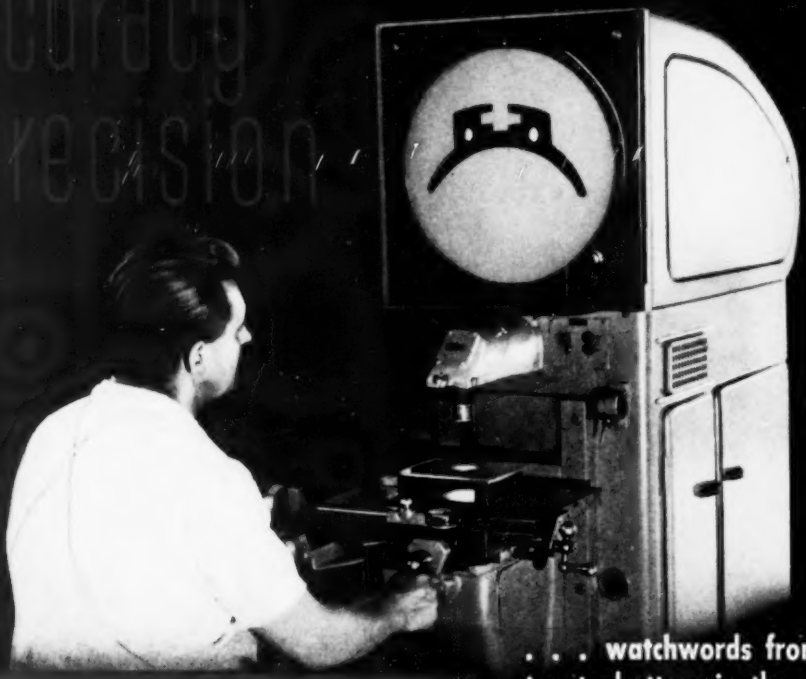

Comparing piece parts with tolerance drawings on Bausch & Lomb and Jones & Lamson comparators.

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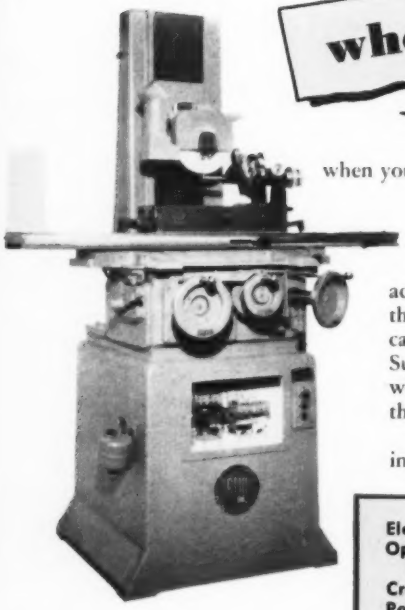

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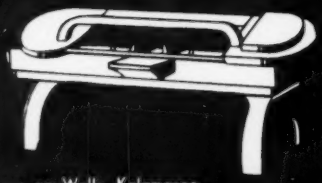

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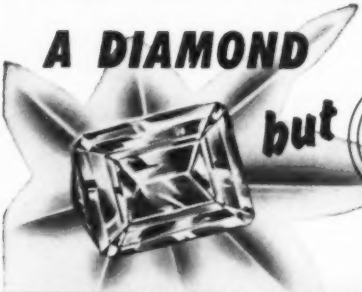

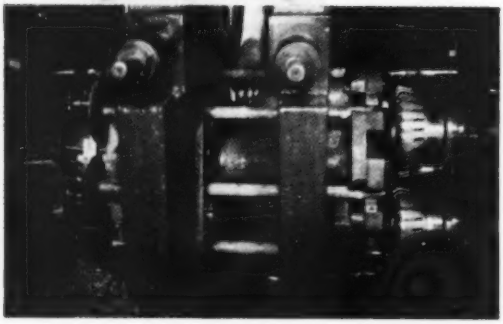

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Machine.....Davis Thompson Milling Machine
Part.....Rear axle shaft
Operation....Rough and finish mill spline end
Material.....S.A.E. 1038–Brinell Hardness 179-229
Tools.....Wesson 6" and 8" dia. Milling Cutters–fine pitch–inserted blade
Speed.....8"–387 S.F.M.
6"–290 S.F.M.
Feed.....14" per minute
Production....150 pcs. per hour
1500-1700 pcs. per grind
Grade of Carbide....Wessonmetal WM

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Grinding Hours per year.....10,300	Grinding Hours per year.....2500
5 Machines Running 3 Shifts	3 Machines Running 2 Shifts
Machine Repair per year.....$25,000	Machine Repair per year.....$1200
Tool Cost per Piece.....$.00545*	Tool Cost per Piece.....$.00213*

*(Machine repair and grinding costs not included)

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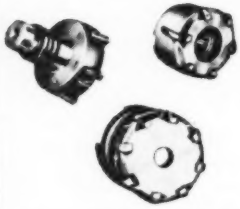

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Three Ways for Setting Lathe Tools on Center

By **John Duckworth**
Tool Engineer

TOOLS for screw-cutting, forming and taper turning in lathes must be mounted in the tool post so that their cutting edges are aligned with the spindle center line. Ordinary turning tools which have been ground carefully to precise rake and clearance angles will not yield their expected cutting efficiency if their position in relation to the lathe center line is not controlled by some form of gage.

Many tool height setting gages have been evolved but the inconvenience of using them often results in their disuse by lathe operators and setters who fall back on the haphazard method of guessing the tool edge position. Some enterprising engine lathe manufacturers inscribe a center line on the tailstock barrel to which the cutting tool edges may be set for height. This device is useful on small bench lathes where the operator does not have to crank the saddle for a long distance on the bed in order to align the tool edge with the tailstock line. It proves very inconvenient, however, on long bed lathes having heavy tailstock where the exertion of moving either them or the saddle is no light undertaking.

Three different forms of tool height setting gages which have proved very efficient in use are described here. They have the advantages that they are small in size and do not require any cranking of the saddle or other long and heavy manipulative work to bring them into use.

The height setting gage illustrated in figure 1 is designed for use with a four-station tool post. It relies on the fact that the top surface of such a tool post is in a fixed position relative to the lathe spindle center line, thus forming a reliable surface from which the gage can be used.

Two main parts, a pillar and a bent arm, make up the height setting gage. The pillar diameter is limited by the space available on the top of the tool post. In some cases, an extensive area is available for accommodation of the

pillar, allowing it to be moved about freely.

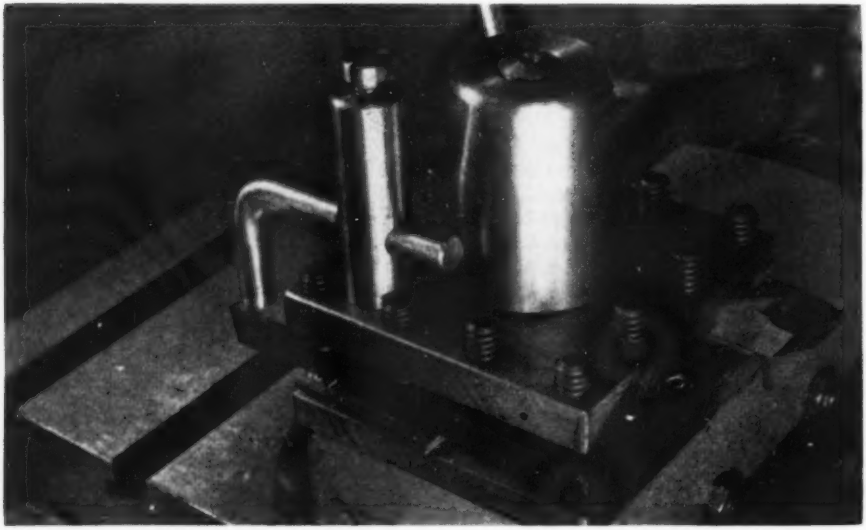
A downward bent arm fits in a cross hole through the pillar and is flatted on its top surface for engagement with a screw placed axially in the top of the pillar. The reach of the arm can thus be increased or reduced to suit the different amounts of tool projection from the tool post. The gage in figure 1 has proved very useful in tool setting on the lathe illustrated; other versions of it have been made for turret lathe use. In the case of larger size gages, it has been found cheaper to use a straight horizontal arm and to drill and tap this for a downward projecting bolt, the bottom end of which is the gaging face for contact with the cutting tool. This construction allows the gage to be preset for placing tool edges above center. It also enables the gage to be used on other machines which require different amounts of downward projection on the bolt.

An entirely different form of height setting gage is illustrated in figure 2. In this example, a V-plate makes contact with the periphery of a circular workpiece held in the lathe chuck. Integral with the plate is a horizontal arm carrying a cheap metal-cased spirit level which is held in place by a pair of metal clips. When the lathe tool is dead on center, the bubble in the level is centrally placed within the lines on the level glass. It can be seen from figure 2 that a horizontal step machined on the V-plate makes contact with the cutting tool tip.

If the tool is above or below center, the arm carrying the spirit level will be tilted downward toward the back of the lathe, or upward, and this tilt will be revealed by the spirit level bubble since the V-piece has rotated through an arc around the theoretical center of the work.

When setting this height gage after it has been made for any particular lathe, I have found it convenient to proceed as follows: Set a tool on center in the tool post by using a vernier height gage or some other precise means,

Figure 1.



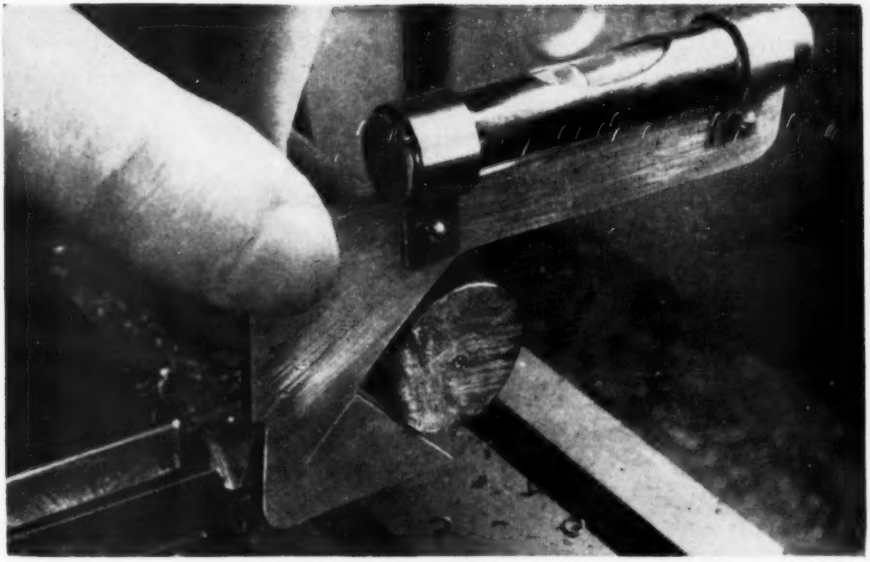


Figure 2.

then apply the gage as in the illustration. If the spirit level bubble is off center, some material can be ground off the tool step on the V-plate in order to bring the bubble to the central position; excess material having been left on the step for this purpose.

Of course, the gage could be elaborated by providing a jacking screw at one end of the level so that it could be set to suit any particular lathe. In machine shops where all lathes are dead-level because they are straightened up regularly by means of a precision level on the bed, this gage can be used on any lathe. The setting of the level is only necessary where lathes are known to be tilted backward or forward.

This gage is suitable for small engine lathes because of the short distance between tool and work, enabling it to be applied with minimum effort. The forward projecting arm on which the spirit level is mounted can be any length and the greater this is the more sensitive will be the bubble to slight variations in tool height. The size of the gage is indicated by the thumb in the illustration. A variation of 0.010" in tool height produces a perceptible shift of the level bubble. The gage is designed for use on bar stock from 1¼" downward but its proportions can be scaled up for use on larger machines.

A simpler variation of the spirit level type of tool height setting gage is illustrated in figure 3 and will be seen to utilize a standard adjustable square stock incorporating a built-in level. A special blade is made to fit in the stock by milling a longitudinal slot to accommodate the locking screw. A V-notch is machined in the special blade to fit on the work in the lathe, and the apex of this V is shown by an engraved line running horizontally from it. The line is set to the face of the square stock

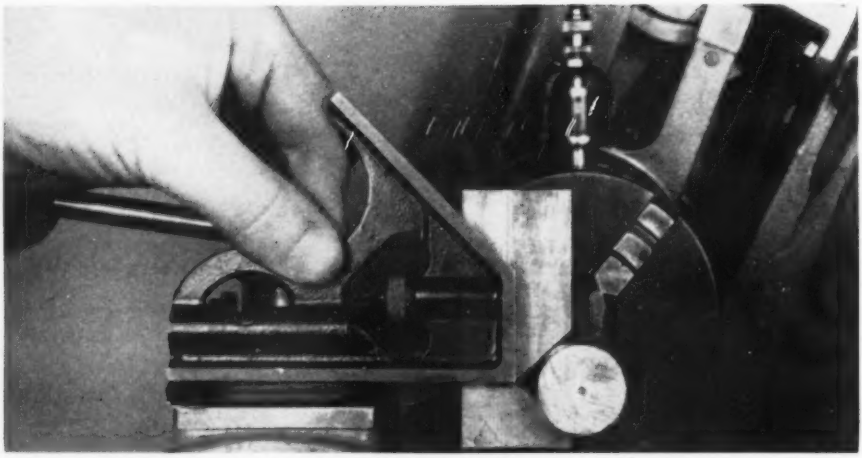


Figure 3.

when the special blade is to be used so that the V is centralized with the stock face.

With the V engaged with the work and the stock face resting on the top of a correctly set tool, the bubble in the level will be central. Any movement of the tool above or below center will shift the bubble. In figure 3, the cutting tool has been swivelled to the farthest distance away from the work so as to accommodate the gage. It will be apparent, therefore, that this gage is more suited to large lathes which have more space available.

This form of gage is as sensitive as the one illustrated in figure 2. It can also be pre-set to compensate for lathes which are not dead level, since the line scribed on the blade to denote the V apex can be shifted up or down to bring the bubble central when the square stock is resting a tool point which is dead central with the machine spindle.

Very large V-plates can be made to fit the square stock so that work of about 10" diameter will fit therein. An advantage of both spirit level types of gages is that they can be used on tools held in any form of tool post, including the popular pillar-and-boat kind. **The End.**

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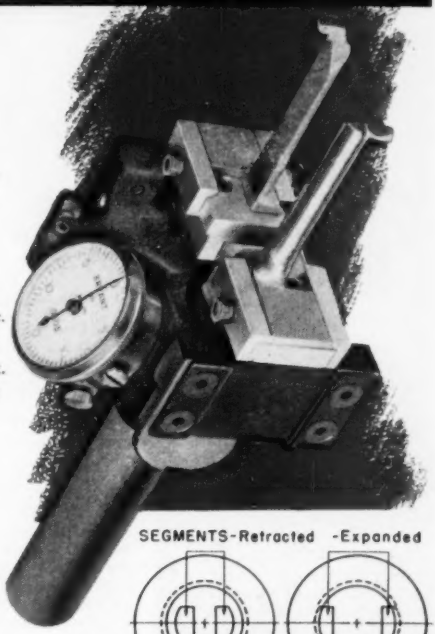

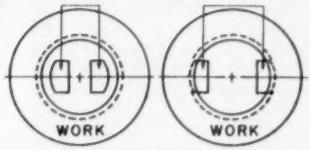

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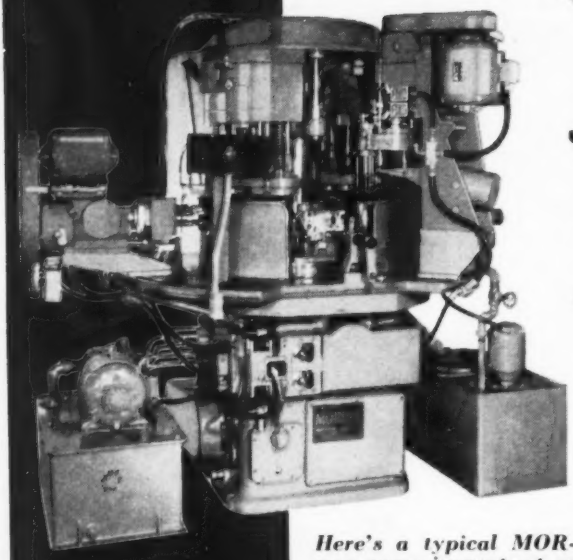

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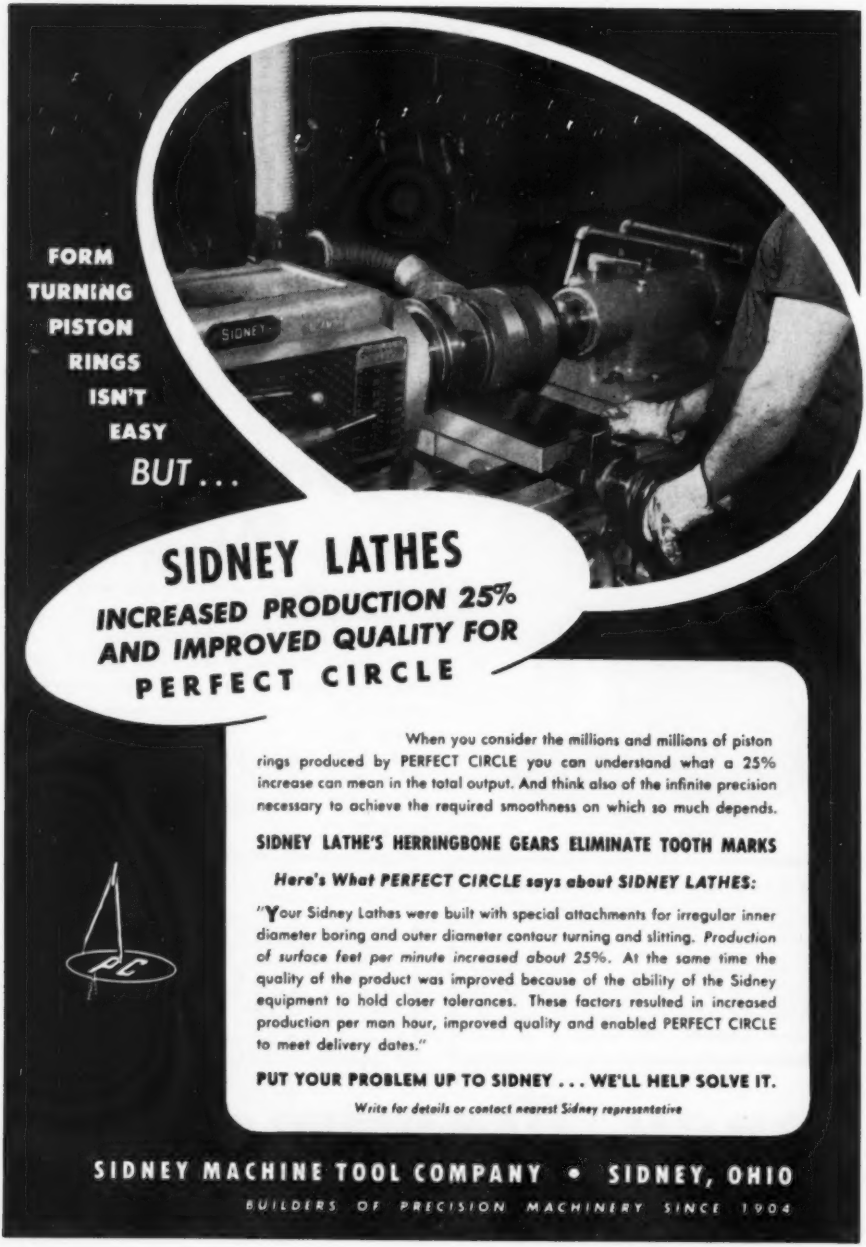
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Foremanship Forum

Who Are You Talking To?

By **Edmund Mottershead,**
President, Mottershead Associates

MORE THAN ever before, the foreman's job today is a job of leadership, a problem of dealing with people. To be effective as a leader, a foreman must be able to say the right thing at the right time . . . to be an effective speaker either to one individual or to a group of other foremen and supervisors. Foremost among his problems as an effective speaker is the problem of appealing to his listeners so that they will **want** to do as the speaker suggests.

The only answer to this problem is an understanding of the basic desires of most people and of the specific desires and hopes and fears of the person or group to whom he is speaking at any given moment.

What do you want out of life? Money, fame, power, security? Loyality of friends, the maintenance of law and order, a feeling of accomplishment, justice, liberty, happiness? Certainly, most of us want some or all of these plus a new car, a deep freeze, and a television set bigger than our neighbor's. One thing you can be sure of—the people who make up your "audience," whether one person or a group, want these same things in some measure.

In dealing with people, it is first your task to determine your own specific objectives. The next task is to determine the objectives and desires of your listeners so that you can understand them and talk to them from the standpoint of their own interests.

Professor Harry A. Overstreet, in his book, "Influencing Human Behavior," says: "Action springs out of what we fundamentally desire . . . and the best piece of advice that can be given to would-be persuaders, whether in business, in the home . . . in politics or factory . . . is, first: Arouse in the other person an eager want. He who can

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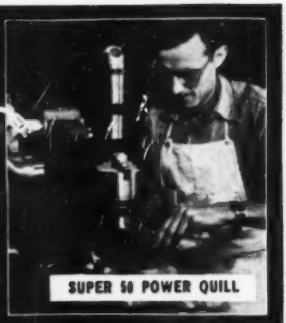

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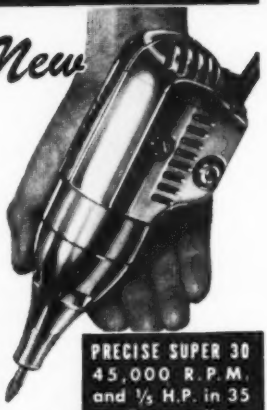

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do this has the whole world with him. He who cannot, walks a lonely way."

Dale Carnegie says: "If you want to gather honey, don't kick over the beehive . . . the only way on earth to influence the other fellow is to talk about what he wants and show him how to get it." To be a leader and get the action you want from people, you have to **make them want to do it.**

Let's suppose I am breaking in a new man on a job. I might say to him: "Bill, we've picked you to do this job because we thought you were the right man to do it. It's not too difficult, and it offers you an opportunity to show us the sort of stuff you're made of. If you make good on this, you will have many chances for advances to better jobs with more pay." What am I appealing to? Bill's desire for security, for more money, for advancement.

What do people want? Psychologists differ in listing basic human emotions

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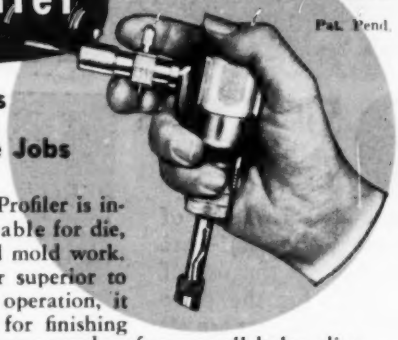

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and motives, but they generally agree that we are all moved by a desire for self-preservation which expresses itself in terms of a concern about health and safety, a desire for profit or gain or higher wages, and a love of our family and friends.

In addition, we all want recognition, a feeling of importance, a feeling that we "belong" to some group of people in society, a feeling of usefulness and achievement, and a sense that life is meaningful or that we can understand pretty much what goes on around us. To some degree, many of us enjoy a feeling of superiority over our neighbors in some matters. Finally, we all demand some means of justifying our own conduct and ideas.

The desire for recognition shows up in many ways. People like a little pat on the back for good efforts or for good

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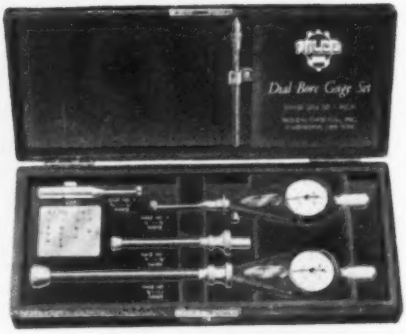

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intentions. They like the sense of importance that comes from giving advice or doing someone a favor. They want credit for their ideas and suggestions. One of the surest ways to get close to your listener's heart is to tell him that you are talking to **him** about your particular problem because **he** is the man best suited to understand what you are talking about and appreciate the importance of the thing you need to have done.

Identification . . . the desire to "belong". . . is the process of building yourself up by identifying yourself in your own mind with some group or ideal or institution which already is recognized generally as being important. This psychological force is the basis of the team spirit. It underlies political parties and religious groups, labor unions and bowling teams. In some ways it means "keeping up with the Joneses" as to fashions and cars and

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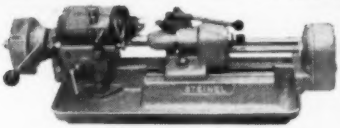

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The other side of the same basic desire to feel important is the one which expresses itself in a feeling of superiority. People in some instances are often quick to point out the other fellow's faults, usually ignoring their own similar shortcomings.

Finally, most people are basically reasonable. Within the limits of their intelligence and education they can be reasoned with. They want to understand what you are saying in terms they can appreciate against their own experience.

In making your ideas acceptable to your listeners, appealing to their basic urges to understand, what you say must be fairly well in accord with what they already know and believe. Hence, ex-

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amine your people closely: what beliefs have they? What prejudices and convictions already exist in your listeners against which you must present your possibly new ideas? Will they listen to a reasonable presentation of a new operating method, or are they conscientiously opposed to changes of any kind from their habitual way of doing things?

When you get down to cases on specific individuals or groups, consider, for example, their age. Younger people will generally accept "new" ideas more readily and uncritically; older people dislike new ideas and are inclined to be skeptical, testing the idea against their own knowledge. What is the specific educational background of these people, or this individual? These are but a few of the items you need to know, which serve as indices of their ability to understand what you say.

What do they know about your subject? You would not, for example, make the same explanation of a blueprint to

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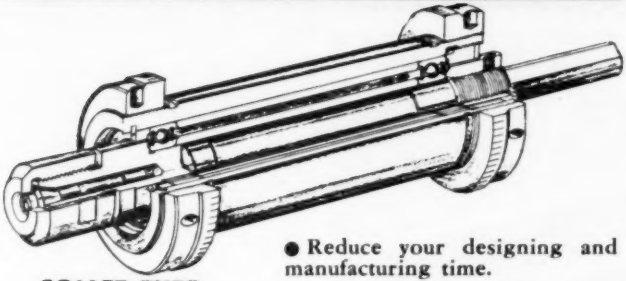

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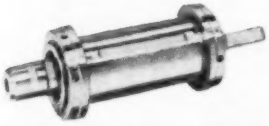

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a pattern maker that you would to a drill press operator. Nor would you discuss vacation pay in quite the same terms with a worker as you would with the shop steward.

What is their attitude towards you, personally, and towards your subject? Favorable, friendly, unfriendly, hostile? It sometimes happens that people will dislike an individual and agree with what he says; while the same individuals will feel very friendly towards another individual and disagree violently over his ideas.

Effective speaking and effective leadership are inextricably bound up together. If, as a foreman, you look forward to a long future with your company with chances for further advancement, you will want to bring your work and your abilities to the favorable attention of management. Top manage-

ment tends to judge a supervisor by his cost record, his quality record, and his production record, but all three of these depend directly upon his success in dealing with the men under him and with the other foremen and supervisors in the plant. Your ability to handle people will gain favorable recognition from management faster than anything else, and this ability depends upon your ability to say the right thing at the right time.

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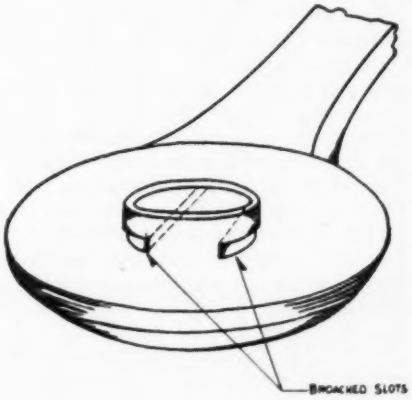
Machining Innovations Expedite Work on Zinc Die Castings

Broaching slot in window regulator handle hub proves faster than side coring. Special dial fixture is hand loaded but automatically clamps workpieces. Cam die removes burrs and burnishes hub hole.

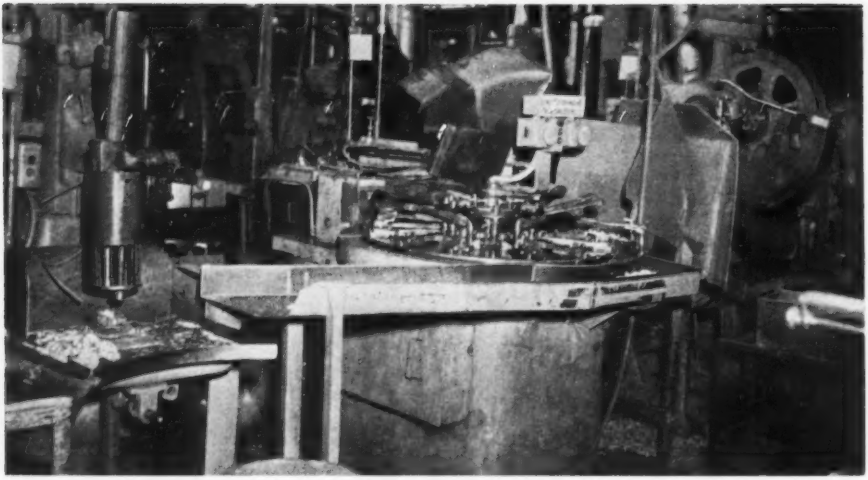
By **Herbert Chase**

CRANK handles for window regulators on the majority of General Motors cars are zinc alloy die castings produced and finished in large volume by one of the Detroit plants of the Ternstedt Division of that corporation. These handles include a central flange on the back of which is an annular boss forming a hub, figure 1. Slots through the side wall of the boss provide openings for a wire spring by which the handle is locked to the end of the regulator spindle that fits the hub hole.

For many years, the side slots in the hub were made by side cores of the casting die but these cores left flash where they joined the hub hole and



1. Sketch of a regulator handle die cast in large volume in zinc alloy by a Detroit plant of the Ternstedt Division. Slots at sides of the hub, formerly cored, are now broached with economies outlined in the text.



2. Special horizontal broaching machine equipped with a dial fixture in which slots in the hubs of 1500 die cast window regulators are broached an hour. Only loading and unloading are done by the operator.

such flash had to be pierced out. Moreover, the side cores added complexities to the casting dies and also limited the number of cavities that it was feasible to use per die. This, of course, increased the number of dies needed and also required the use of more casting machines and more operators than if dies, each having more cavities, could be used.

Consequently, it was decided to eliminate side cores and to use casting dies with more cavities. In these, the hub hole and that for the crank knob pivot are cored precisely, as before, for these cores are at right angles to the die parting. To produce the slots rapidly, however, a special broaching machine, figure 2, equipped with a 12-station indexing dial fixture was provided.

In this machine, the broaches are moved by a horizontal reciprocating slide and they produce a slot at each side of the hub each time the slide makes its working stroke toward the fixture. All the operator of the machine need do is to load each fixture recess with a casting as it reaches the station at the front of the machine, after first removing the casting returned to the unloading station with slots broached.

As the fixture indexes, cam operated levers are lowered and lock each zinc die casting in place, holding it securely when it pauses at the station where broaching is done. With further motion of the dial, the locking lever is released and elevated, leaving the broached casting ready for the operator to remove and drop into a chute at his right. This chute carries the casting to a light press for the next operation. With the broaching machine, one man can handle fully 1500 pieces an hour, which is fast broaching. Width of slots broached is held within 0.004-in. limits.

Broaches throw burrs into the cored hub hole and they have to be removed, a job done in the light press just mentioned, using the cam die, figure 3. Castings are loaded one at a time by hand, with slots facing the ends of two

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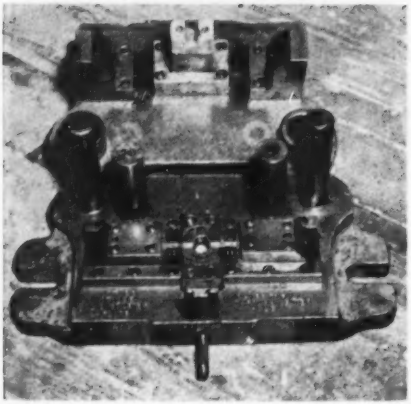


3. In this die, cam-operated punches moving inward radially remove burrs from broached slots in die cast zinc alloy window regulator handle hubs. In the same die, a burnishing broach, not shown, finish sizes the hub hole.

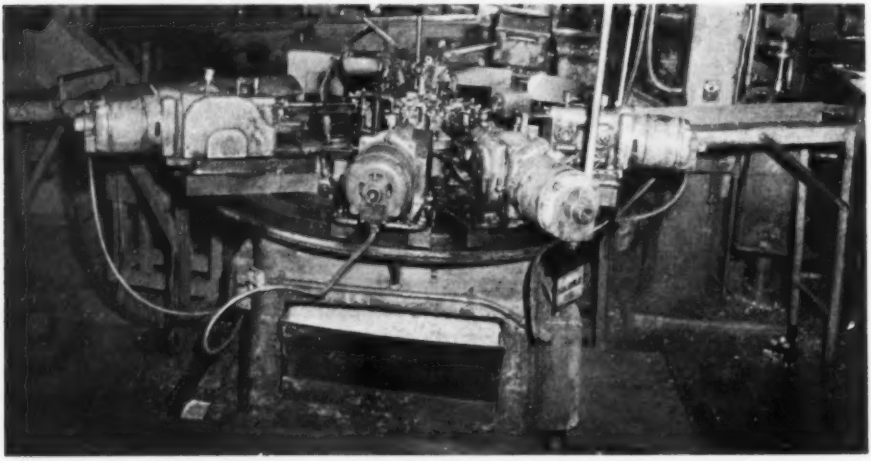
horizontal punches that are moved radially inward as the side cams are actuated. Before the punches move, however, a burnishing broach is passed through the hub hole to size it finally. As the broach retracts, any burrs pushed into the hole by the punches are removed.

It is not difficult for the press operator to keep pace with the broaching machine, as he can load the die and trip the press as rapidly as the broaching machine delivers broached parts. No other machining is required on the die castings and they are ready to be polished as a preliminary to plating.

Many other handles, including both interior and exterior types for doors of several makes of cars and some trucks, are die cast from zinc alloy in this plant, the total approximating one-and one-half million handles a month. Most of these require minor machining operations but, as remarkably close dimensions are held as cast, including dimensions on cored holes, only a few critical dimensions (or holes that cannot be cored economically) necessitate machining, although threads have to be tapped.

Typical of some operations are those

4. Automatic Kingsbury setup employed by Ternstedt to drill and counterbore holes in die cast handles for truck doors and then to tap the holes. Two castings are handled at a time, at the rate of 879 pieces an hour.



done on truck door handles in the Kingsbury setup, figure 4. Heads arranged radially around the fixture on this machining do drilling and counterboring of hub holes of two die castings at a time and then tap the holes in a fast automatic cycle. A single girl tends the machine but does only loading and unloading of parts, at the rate of 879 an hour. Such high speeds are common in this plant and are made possible by good tooling, by ease of machining of the zinc alloy and by the fact that cuts are always light, so that only a small amount of metal need be removed.

The End.

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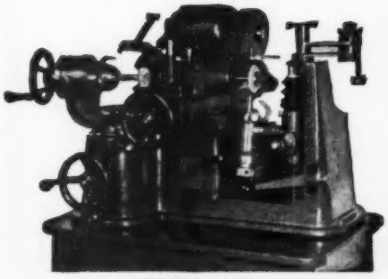

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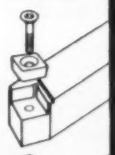

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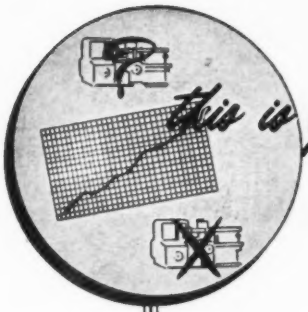

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By **Tom Brown**
Consulting Engineer

ONE WAY to make the most efficient use of existing machines is to fit them with tooling which will convert them to special machines capable of performing operations for which they were not designed originally. An example of applying this principle to a plain horizontal milling machine for the continuous production of square heads on special bolts forms the subject of this article. In effect, the equipment enables straight line milling to be performed by means of a continuously rotating fixture so that starting and stopping of the machine, with its attendant time delays, is avoided. Principle of the method can be used for a wide range of components. This article describes only one way of using the principle and although some readers may quibble about the economics and other details of the setup described, the author can only say that the equipment was designed to meet a special set of circumstances and was successful; other circumstances may require different procedures.

Straight line milling with a rotary fixture calls for a rather unusual form of design and this can be best explained by reference to the schematic plan view shown in figure 1. A circular plate **A** rotates in synchronism with the milling machine mandrel and on it are mounted four work holders equally spaced in four radial slots machined in it. The work holders can slide radially within the slots and can also rotate. The horizontal milling machine mandrel is above the plate and is represented in figure 1 by the line **B-B.** On the mandrel are two sets of cutters arranged to straddle mill the width of the square, each pair of cutters producing one pair of flats.

It will be apparent that the plate imparts an arcuate movement to any work mounted on it and means must be provided for converting this to a straight line movement of the work when it is passing between each pair of flat milling cutters. Accordingly, below the revolving circular plate are two pairs of fixed straight line guide plates

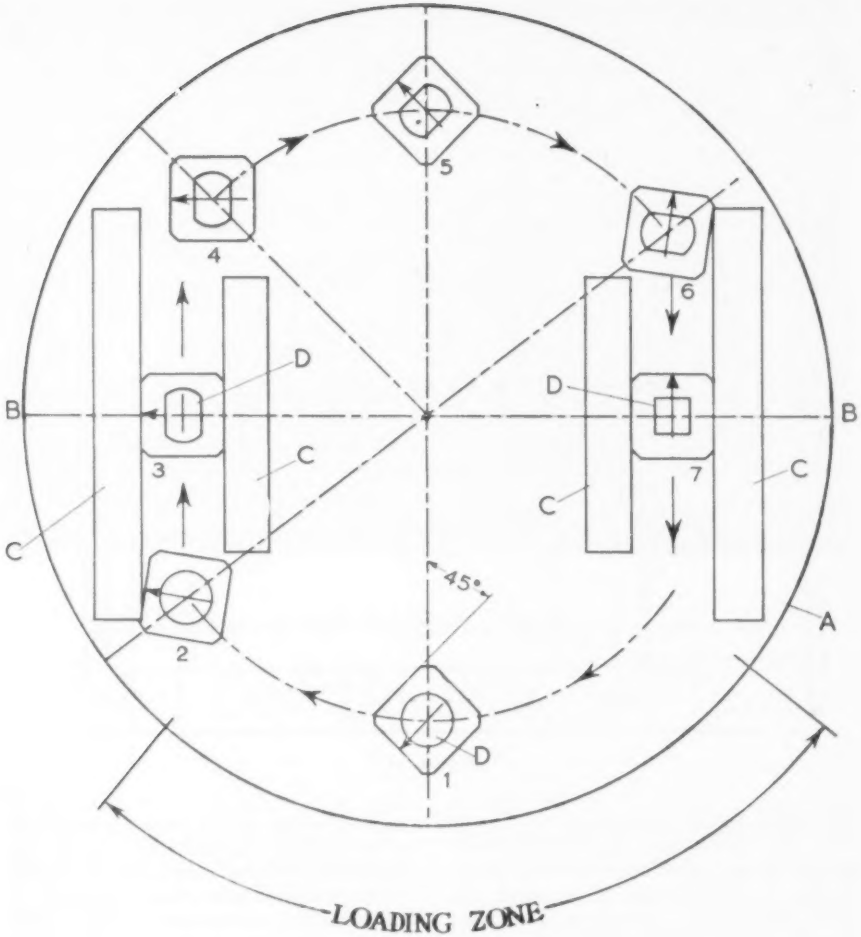


Figure. 1.

C and between them slides a downward projecting square on each work holder. Since each work holder can slide and rotate in the circular plate slots, they will be under the control of the straight line guides when they are carried around by the plate. An interesting feature of this fixture is that the process of carrying the work holders around on a flat-sided elliptical path causes them to be automatically indexed through 90 degrees during each half revolution of the plate. This is just what is needed to produce a completely milled square bolt head.

The positions of one work holder during one complete revolution of the plate are numbered consecutively in figure 1.

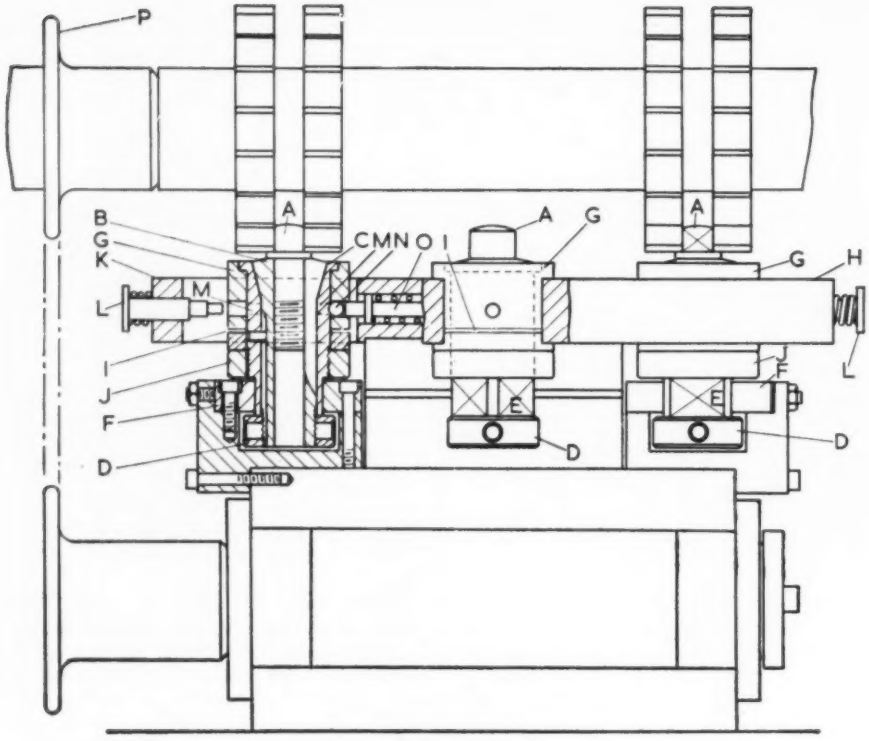
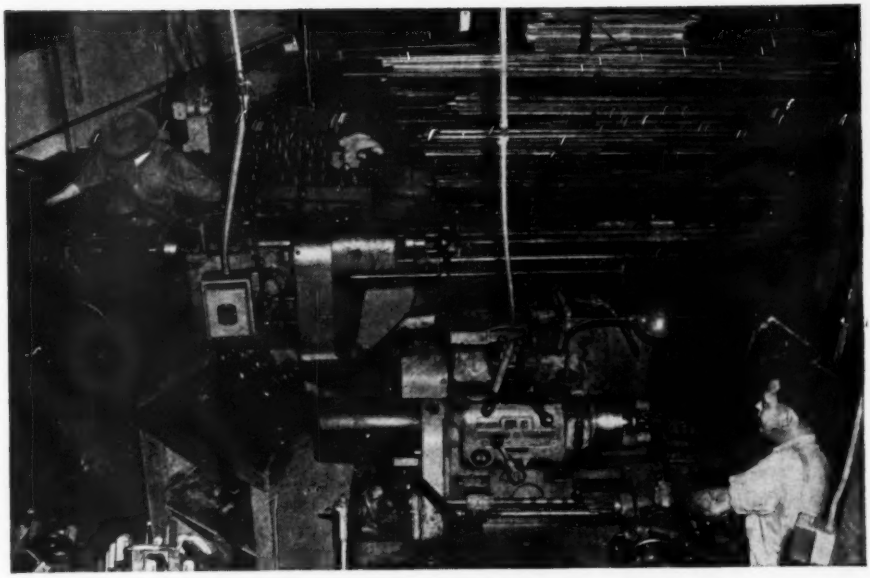


Figure 2.

The outer square represents the lower end of the work holder while the inner smaller shape **D** shows the progress of milling the bolt head. Rotation of the work holder as it passes from one position to another is indicated by the arrow marked thereon and the radial broken center lines indicate the radial slots in the plate.

A component is loaded into the work holder, roughly at position 1, while it is travelling through the arc denoted as the "Loading Zone." The flats on the work holder, during loading, are at 45 degrees to the radial line of the plate slot. The plate rotates in the direction denoted by the arrows until the flat marked by the arrow head on the work holder makes contact with one of the fixed straight line guides (position No. 2). The work holder then travels in a straight line between the guides under the action of the rotating plate and the top of the component travels between the first pair of cutters (position No. 3).

When the work holder reaches position No. 4 it passes from the straight guides, which have had the effect of turning it through an angle of 90 degrees; if the arrow heads on the work holders in figure 1 are studied in their various positions relative to the chain dotted center lines, the indexing action will become clear. At position No. 6 the



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work holder square makes contact with the second pair of straight guides, so that the component travels through the second pair of cutters for milling the second pair of flats at position No. 7. The holder then leaves the last pair of guides entering the loading zone where the component is removed and another substituted.

An end view of the fixture used in adoption of this principle is shown in figure 2 and a side view from the front of the milling machine is shown in figure 3.

Referring to figure 2: The component **A** is gripped in a standard pull-down collet **B** and housed within the cylindrical hardened and ground sleeve **C**. The collet is pulled down for tightening by means of the nut **D** which has holes in its periphery for engagement with a small diameter bar. The lower end of the collet sleeve has four flats **E** machined on it for engagement with the straight line guide plates **F**.

The collet sleeve can rotate within the bronze sliding block **G** which is housed within a radial slot machined in the rotating plate **H**. The sliding block is split horizontally at **I** so that the sliding clearance may be adjusted by means of the thrust nut **J**, which also adjusts the end thrust of the collet sleeve **C**. The four radial slots in the plate **H** have sides which are a close sliding fit on the sliding blocks and the end of each slot is closed by an end piece **K** bolted and dowelled in position.

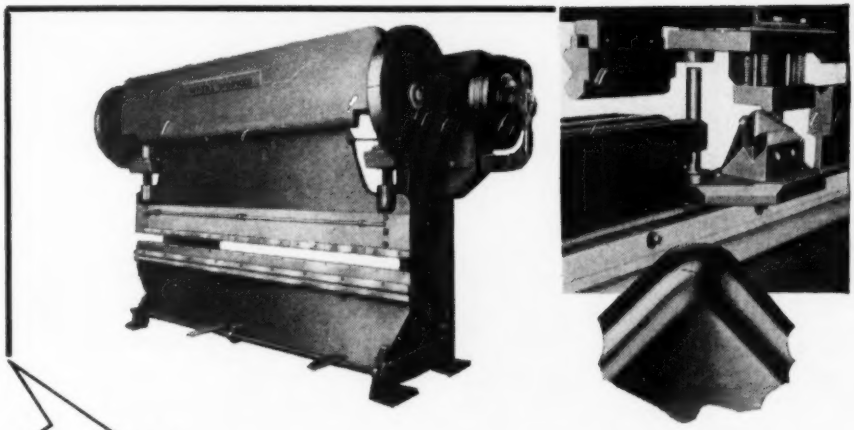
Reference to figure 1 shows that the diagonal line across the corners of the collet sleeve is aligned with the radial center line of the top plate during the loading period. This is necessary in order to ensure that the flat on the collet sleeve is in a suitable position for engagement with the straight line guide. Since the collet sleeve is rotatable, means are provided for locking it in place while the collet is being loaded. This is achieved by means of the locking pin **L** shown in figure 2.

When the work holder enters the loading zone, the operator depresses the locking pin **L** so that it passes through the hole in the sliding block and its end engages with a hole **M** in the collet sleeve, thus locking this against rotation. The operator can then undo the nut **D**, release the collet and remove the component, replacing it with a fresh piece. When the pressure on the locking pin is released, it is pulled away from the collet sleeve by means of the compression spring encircling it.

Under the action of machine vibration, it would be possible for the work holder to rotate, after loading, so that the flat would not be in a good position for engagement with the straight line guides, unless some means were provided for holding it in the correct location. As there are four equally spaced holes **M** for engagement with the locking pin, the hole on the inner side of the sliding block houses a steel ball **N** which is pressed on the collet sleeve by means of the spring loaded plunger **O**. When the collet is being loaded, one of the holes **M** in the collet sleeve will be in line with the steel ball which will engage therewith and hold the collet sleeve sufficiently to resist it turning under vibration. It acts after the manner of a spring loaded ball-catch and relinquishes its hold automatically when the straight line guides come into action on the collet sleeve.

Spring loaded plunger **O** serves an additional purpose; it urges the sliding blocks out to rim of the plate **H** when the straight line guides are out of contact with the collet sleeves, thus ensuring that the holders are in the correct positions when approaching the guides. The apparently short locking pin **L** can then engage with the holes in the collet sleeve for the loading operation.

Referring to figure 3, it will be seen that the base of the fixture encloses a worm and worm wheel mechanism for rotating the vertical spindle which is surmounted by the rotating plate. The



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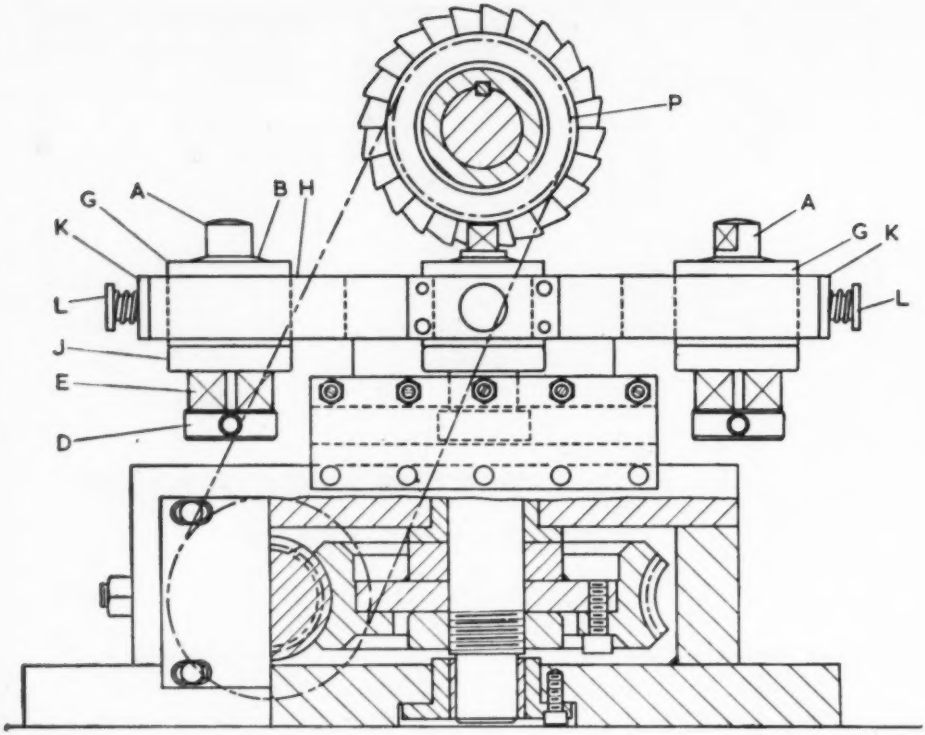

Figure 3.

construction of the fixture body may be familiar to some readers as it forms the basis of a worm wheel hobbing fixture which was described in MACHINE and TOOL BLUE BOOK, August, 1953. Tool designers should always keep in mind some of their previous designs as these can often be modified to do new jobs. The aforementioned worm wheel fixture was driven from the milling machine mandrel through a train of gears feeding into the worm shaft. The gears are dispensed with in the setup described and the drive is by means of a sprocket **P** on the mandrel connected by roller chain to another sprocket on the worm shaft. This arrangement allows room for experiment by employing different size stock sprockets to obtain different rates of feed on the revolving plate. Since the machine table is locked in place, the chain tension can be adjusted when setup remains constant.

The straight line guide plates **Q** are shown in section at the left of figure 2 and are hardened and ground with the inner plate fixed and the outer one arranged to be adjustable horizontally so that the gap between them can be set to fit snugly the squares on the collet sleeves.

Since the first pair of flats is milled with the component running through the cutters in one direction and then in the opposite direction for the second

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pair of flats, both up-cut and down-cut milling are performed at the same time. This has the effect of balancing the load and a smooth milling action is obtained. The backlash-free adjustment of the worm wheel mechanism also contributes considerably to the smoothness of the milling.

The uses of this fixture are by no means limited to the milling of squares on one type of component. Since standard purchaseable collets are used for work holding, any component which can be gripped in a collet can have flats of various types milled on a production basis. With two gangs of three cutters and two cutters, respectively, the milling of such components as clevises can be done at high output rates.

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actually limited by the loading capacity of the operator. It is admitted that the collet tightening arrangements are not ideal from the viewpoint of operating speed. The actual output of milled squares, as shown, was one every 75 seconds, but because unskilled labor was used, and the machine did not represent a very heavy investment, the output rate was satisfactory and was five times higher than that obtained with a manually indexed collet fixture and one pair of cutters.

By using push-up collets and fitting a large diameter steel ball at the bottom of each one it might be possible to obtain some degree of automatic collet operation. The steel ball on the bottom of the collet would run on the bottom of the trough formed between the

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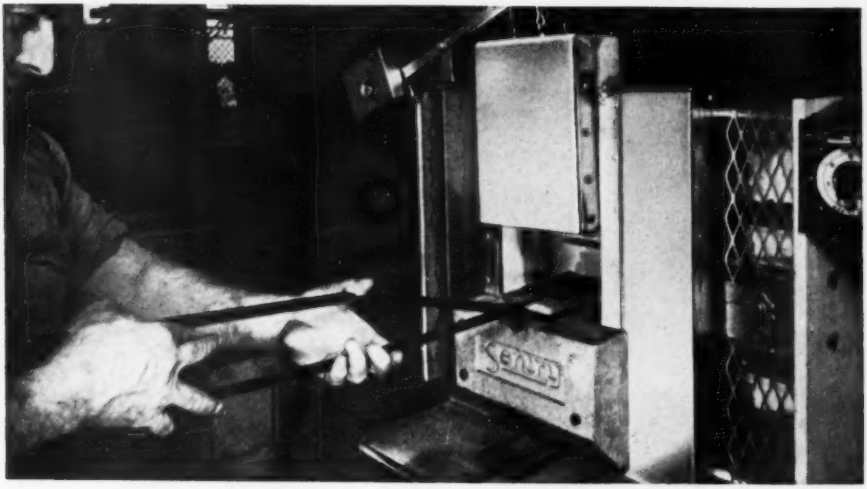

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straight line guides and the collet would be held up in a locked position. Between guides the ball could be supported by a special plate which would continue the surface between the two guides. At the loading point, the support plate could drop and the collet would open automatically. Closing would be automatic by causing the ball to run up a ramp out of the loading zone and into the first pair of guides. This is what the author would like to do if he had a free hand. As the fixture stands, the user is satisfied. With automatic collet operating it would be possible to fit 8 or more work holders to the same plate instead of the four which are now employed.

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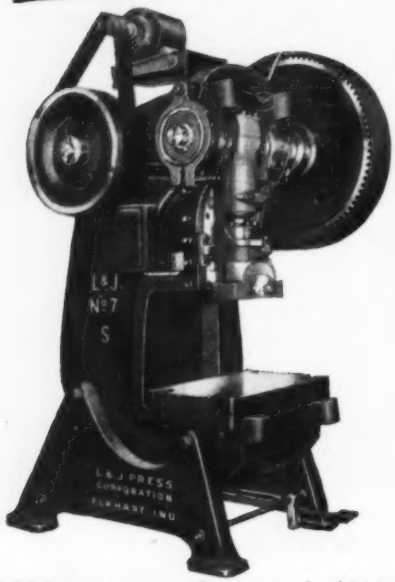

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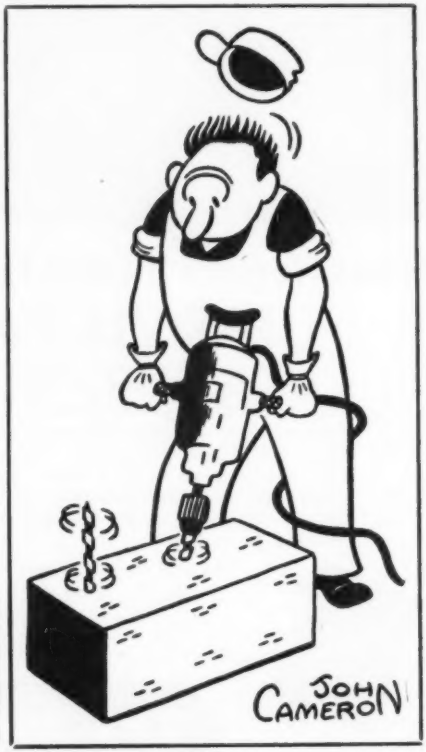

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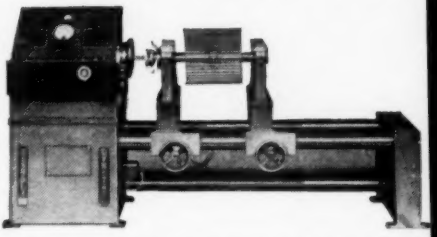

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Cutting tool clinic

I—Single point, flat and circular forming tools

Type of trouble	Probable cause	Suggestions for correction
Breakage	Excessive feed	Reduce feed rate to a point where the tool will stand up under the work pressure or strengthen the tool by design revision.
	Tool deflection	Reduce overhang. Increase tool support rigidity.
	Excessive vibration	Keep machine tool, tool holders, work fixtures, etc., in first class condition. Reduce relief angles to minimum required. Follow suggestions for correcting for tool deflection.
	Clamping difficulty	Make sure that methods of holding the tool do not induce stresses causing breakage under cut.
	Improper resharpening	Check resharpening methods to make sure that tool is not cracked by improper resharpening.
	Dull tool	Do not run tool past the time at which it needs esharpening.
Chipping of cutting edge	Excessive feed	Reduce feed rate or redesign tool to strengthen cutting edge. Possibly use a tougher tool material.
	Improperly ground chip breakers or clearances	Avoid on-the-job additions of chip breakers or curlers. Make sure that specified clearances are maintained or reduce the clearances if excessive.
	Excessive vibration	Keep machine tool, tool holders, work fixtures, etc., in first class condition. Reduce relief angles to minimum required.
	Excessive relief	Do not exceed recommended amounts of relief when resharpening.

Courtesy: Gorham Tool Co.

I—Single point, flat and circular forming tools (Cont'd)

Type of trouble	Probable cause	Suggestions for correction
Burning of cutting edge	Excessive speed	Reduce surface speed to a point at which the tool will stand up. Possibly use a tool material of higher red hardness.
	Hard work material	Check hardness of work material to keep it within range of machinability under the operating conditions.
	Inadequate cutting fluid	Increase flow of cutting fluid or improve direction of flow to cool cutting edge in the cut. Consider use of cutting fluid with better cooling properties with temperature maintained at 70° to 80° F.
Cratering	Excessive speed or feed or both eroding top of tool	Reduce speed or feed to eliminate excessive cratering. Possibly use a more abrasion-resistant tool material.
	Insufficient rake angle	Increase rake angles to reduce friction of chip against tool.
Rough finish	Too high feed rate	Reduce feed rate.
	Too low surface speed	Increase surface speed but avoid reaching speed at which tool burns.
	Dull tool	Do not run tool past the time at which it needs resharpening.
	Improper cutting fluid	Change to cutting fluid recommended for finish on particular work material.
Chip clogging	Chips too long	Use separate chip breakers or grind chip breaker or curler into tool.
	Insufficient cutting fluid	Increase pressure of cutting fluid or so direct flow that chips are washed away.
Rubbing	Too little relief or clearance	Increase relief or clearance until tool does not drag and rub in cut. Do not weaken tool by exceeding necessary relief.
	Tool cocked in holder	Make sure that tool is held in correct relation to the work.

Courtesy: *Gorham Tool Co.*

II—Multiple point rotating tools

Type of trouble	Probable cause	Suggestions for correction
Breakage	Excessive feed	Reduce feed to a point where weakest cross section of tool will withstand the required torque and thrust.
	Too many teeth engaged in cut at same time	Reduce number of teeth in cutter or strengthen cross section to carry load.
	Chip packing	Reduce number of teeth in cutter or increase chip wells by revising tooth shape.
	Feeding without uniform rotation of tool	On arbor cutters, use well fitting key extending into collars on both sides. On shank type cutters, make sure driving mechanism is adequate.
	Dull cutter	Do not run tool past the time at which it needs resharpening.
	Improper resharpening	Check resharpening methods to make sure that tool is not cracked by improper resharpening.
Chipping of cutting edge	Excessive feed	Reduce feed rate or redesign tooth shape to strengthen cutting edge. Possibly use a tougher tool material.
	Excessive vibration	Keep machine tool, arbors, supports, work fixtures, etc., in first class condition. Use an arbor of sufficient size to overcome torsional vibration.
	Excessive relief	Do not exceed recommended amounts of relief when resharpening.
Burning of cutting edge	Excessive speed	Reduce surface speed to a point at which the tool will stand up. Possibly use a tool material of higher red hardness.
	Hard work material	Check hardness of work material to keep it within range of machinability under the operating conditions.
	Inadequate cutting fluid	Increase flow of cutting fluid or improve direction of flow to cool cutting edge in the cut. Consider use of cutting fluid with better cooling properties.
Cratering	Excessive speed or feed or both eroding face of tooth	Reduce speed or feed to eliminate excessive cratering. Possibly use a more abrasion-resistant tool material or apply a case treatment to present tools.
	Insufficient rake angles	Increase rake angles to reduce friction of chip against tooth face.

Courtesy: Gorham Tool Co.

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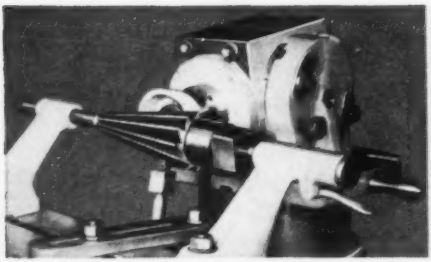

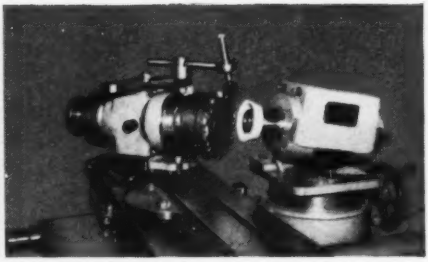

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II—Multiple point rotating tools (Cont'd)

Type of trouble	Probable cause	Suggestions for correction
Rough finish	Too high feed rate	Reduce feed rate.
	Too low surface speed	Increase surface speed but avoid excessive speed.
	Dull tool	Do not run tool past the time at which it needs resharpening.
	Improper cutting fluid	Change to cutting fluid recommended for finish on particular work material.
	Milling against the feed	If conditions warrant, use in-cut or climb milling.
Chip clogging	Insufficient chip room	Reduce number of teeth or revise shape of tooth to provide ample chip room.
	Insufficient cutting fluid	Increase pressure of cutting fluid or so direct flow that chips are washed out of teeth or flutes.
	Tool magnetized	Make sure that the tool is demagnitized after being held on a magnetic chuck.
Rubbing	Insufficient concave	Increase concave to avoid rubbing.
	Work closing in on cutter	Keep work piece cool or clamp so that it cannot shift into cutter.
	Axis of tool out of relation to feed travel	Check machine tool to make sure that it is properly lined up.

The best approach to cutting tool trouble is to make an on-the-job analysis of the tool failure. When the type of failure has been determined, then steps can be taken to remedy the conditions responsible for the failure. Often more than one of the above troubles appear at the same time but a careful study of the actual operation of the tool can correct the troubles as they are isolated.

Courtesy: Gorham Tool Co.

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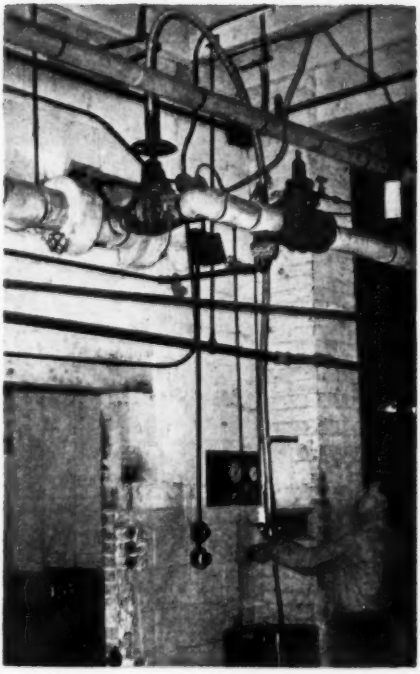
MODERN TOOLS in ACTION

Flexible shafts gain in popularity for grinding in close quarters, remote valve control, etc.

FLEXIBLE SHAFTING has been used for some time by the Navy for remotely controlling valves on ships. Now, industrial plants are using it for such purposes as this or for grinding in places that would ordinarily be considered inaccessible, such as welds on the underside of flanges, where many machines are too heavy or unwieldy. These pictures show equipment manufactured by Stow Mfg. Co., 443 State St., Binghampton, N. Y.

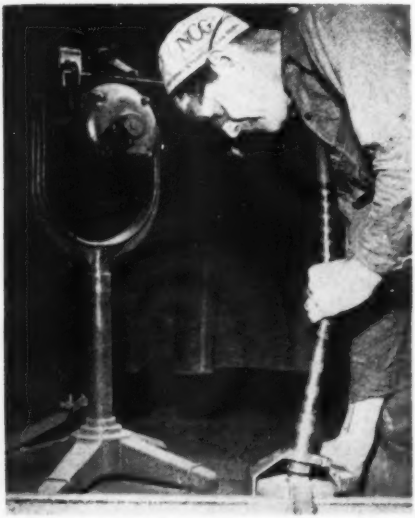
Portable machines are more expensive than bench grinders, but many parts are so large or bulky that a portable tool is necessary to finish off the welds. In



A steam valve with an 8" handwheel is being controlled by a Stow 1" flexible shaft with a 9" plastic handwheel at the other end. Before this shaft was installed, whenever the valve was opened or closed, the operator had to climb up a ladder. Valves as large as those with 27" diameter handwheels may be controlled with flexible shafting, which can be as long as 50'. Also, flexible shafting makes it possible to control many valves in a plant at one central station.

grinding welds pressure must be applied by the operator. To prevent the wheel from slowing down a fairly high powered engine must be used. This ordinarily calls for a very heavy tool or at least one with a large motor case. With flexible shafting the operator can obtain much power with a light, less fatiguing tool. Because of the small diameter at the end of the tool they can be maneuvered in spots such as the inside of castings and pipes.

Brazing the seam of a Freon receiver at the Governair Corp., Oklahoma City, Oklahoma, is a delicate job since they must be completely free from leaks. Before brazing, the connection is "veed" out, using a Macklin A16R8B5 grinding wheel at 3450 r.p.m. After brazing, the seam is ground and wire brushed both inside and outside at 3450 r.p.m. Formerly a heavy portable electric grinder was used which was fatiguing and could not be maneuvered in the tight spots on this job. Output was doubled.



Grinding welds on large frames was a problem for the Governair Corp., of Oklahoma City, Okla. At first they used a heavy portable disc sander with abrasive discs. This was fatiguing and difficult to maneuver in tight spots like the one in the picture. Then they purchased a Stow ½ h.p. flexible shaft machine and as a result have cut operation costs considerably and prevented fatigue. They use a Macklin A16R8B5 grinding wheel running at 3450 r.p.m. There have been no maintenance problems during the seven years this machine has been on the job.

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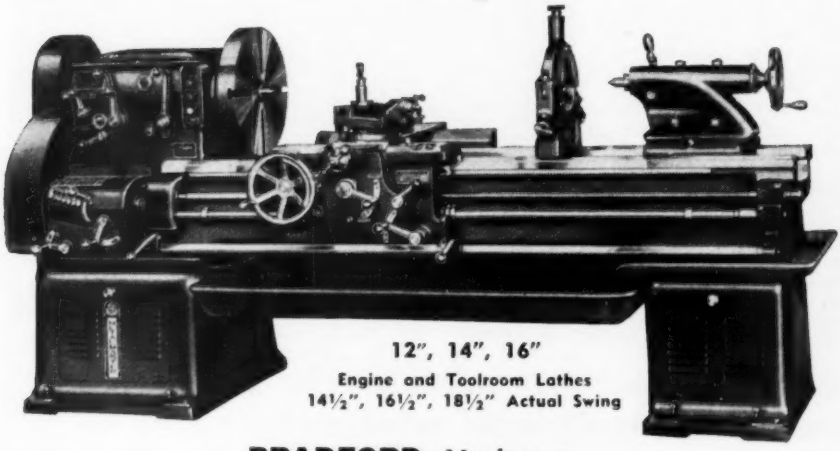

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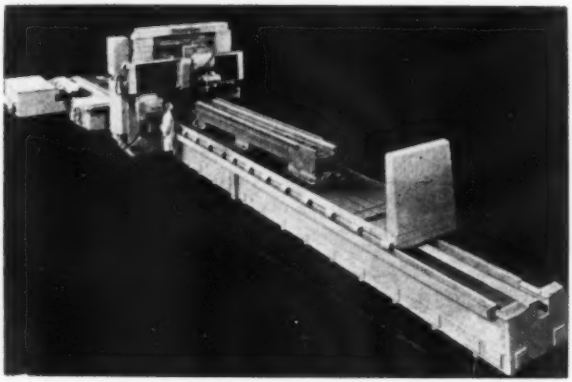
Solar makes own carbide tools

Solar Aircraft Co., of San Diego, Calif., manufactures all of the 1500 carbide cutting tools it uses each month. The company fabricates a variety of stainless steel and high alloy steels and in this work about 1,000 different shapes and sizes of cutting tools are used. When the tools are finished and ready for distribution, they are placed in open racks. An employee removes the tools, loads them on cart and makes three trips during each 8-hour shift to deliver the tools to machines throughout the plant and remove used tools, thus eliminating the necessity for machine operators to visit the tool crib.

The firm has cut its bill for carbide cutting tools in half by making them itself.

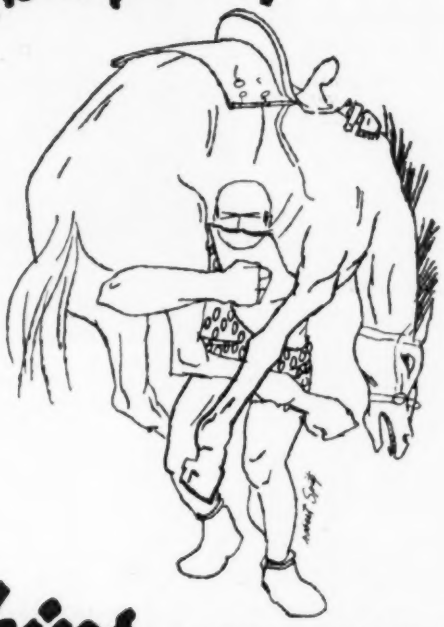
Solar works almost exclusively with high alloy steels in manufacturing aircraft exhaust systems, jet engine parts, afterburners, and a variety of other items. This involves hundreds of different machining operations on many types of alloys, and the company uses almost every type of standard machine tool plus a large number of special machine tools, many of which were designed and built by Solar itself.

Monarch installs world's largest surface grinder



The Thompson Grinder Co., Springfield, Ohio, has recently completed installation of the world's largest surface grinder in the plant of the Monarch Machine Tool Co., Sidney, Ohio. This machine was especially designed to precision grind lathe bed ways up to 32′ long and to the extreme tolerance of .0005″ over the entire length of way. The over-all length is 79′ and it is 13′ high and 13½′ wide. The machine is equipped with four 30 h.p. motors and one 40 h.p. motor driving the two grinding wheels. These grinding wheels can be operated simultaneously. All operations are controlled from a push button panel which is suspended and can be moved to suit the operator. The machine weighs 220,000 lb.

Why carry the horsepower?



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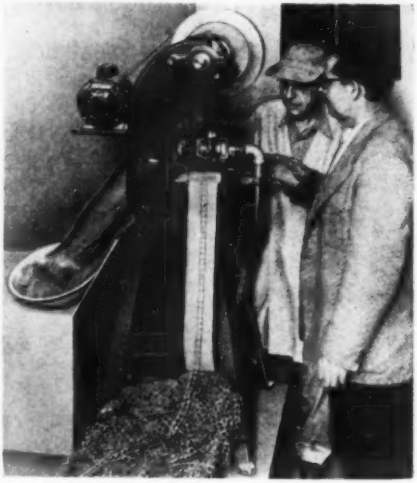
Conveyor moving of heavy material by hydraulics

A coil handling equipment conveyor at the U. S. Steel Sheet & Tin Mill in Gary, Ind., is illustrative of the growing role that fluid power is playing in the movement of heavy materials efficiently and economically. Large, heavy coils of sheet steel are pushed, tilted, lifted and pulled down a conveyor line by means of seven special, long stroke Lindberg air & hydraulic cylinders for final positioning on three gravity conveyors leading to the entry end of the pickle lines. The coils range in size from a minimum of 30″ diameter by 2′ high to 4′ 6″ diameter by 6′ 2″ high and weigh up to 25,000 lbs. maximum.

Cranes lift the coils from the storage area in the raw coil pickling department and position them upright on a powered conveyor leading to a turn table. Due to the varying sizes of the coils, an operator turns the table until the coil fits snugly against the pusher head of a mill type air cylinder with a 16″ bore x 72″ stroke. This cylinder pushes the coil on to a powered conveyor that carries it to a point where a 2,000 psi hydraulic cylinder with an 11″ bore x 84″ stroke operates in conjunction with a special tilting mechanism to tilt the coil on its side. The coil, now at rest on a dolly at the end of this conveyor, is lifted a few inches by a pendulum mounting mill type 2,000 psi hydraulic cylinder. The dolly is pulled down to one of three gravity conveyors feeding the entry end of the pickle lines by a 2,000 psi hydraulic cylinder (D) with an 8″ bore x 288″ stroke, one of the longest stroke single piece cylinders ever built. Three foot mounted mill type 2,000 psi cylinders with 5″ bores x 96″ strokes push the coil off the dolly on to the desired gravity conveyor.

Mass production of rubber washers with small Kenco press

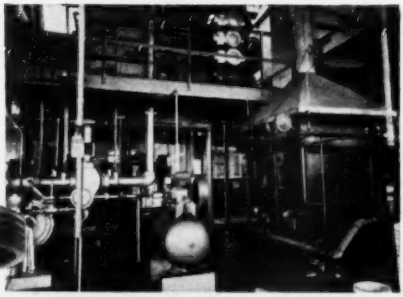


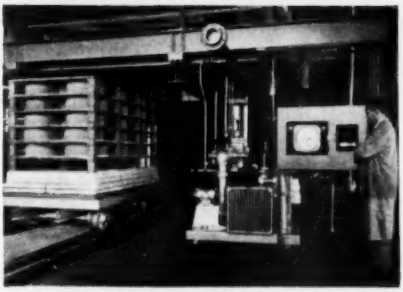
The Stoner Engineering Co. was called upon by the West American Rubber Co., 410 North Avenue 19, Los Angeles, Calif., to provide equipment for producing rubber washers in mass production to meet Navy orders calling for 10,750,000 washers within a limited time.

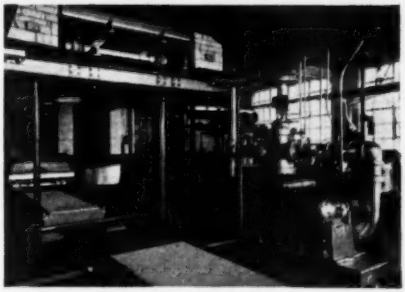
C. E. Stoner decided the Kenco press, manufactured by the Kenco Manufacturing Company, Dept. 8, 5211 Telegraph Road, Los Angeles 22, Calif., incorporated the features necessary to produce these washers.

With the one four ton standard Kenco press, as shown in the adjoining photograph, Stoner is able to produce 24,000 washers per hour. He is now in the process of completing three additional units stationed in a circle so the scrap materials

From the NEW Blanchard Wheel Shop







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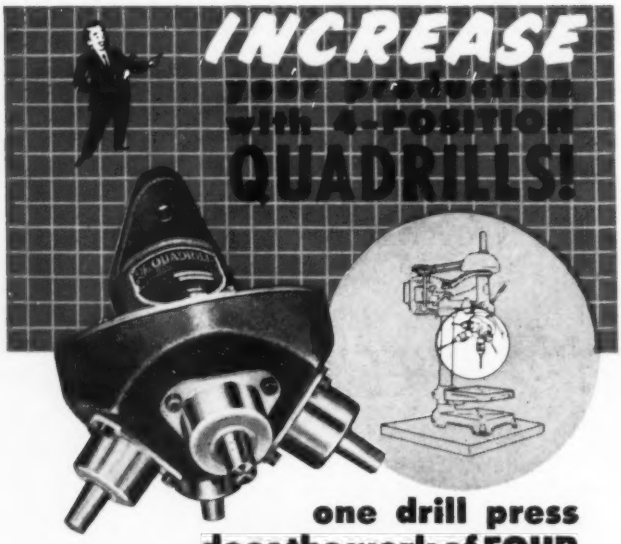

one drill press does the work of FOUR

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will be ejected into a central container. This will permit one man to operate all four presses and produce 96,000 washers per hour. The Navy requirements on these washers are .019 thickness ± .005. The die arrangement together with the roll feed automatically kicks out any washers that do not meet this requirement. The Navy allows 1½% rejects: under spot checking the Navy found only one washer in 750 for reject, or .0133%.

From oiling once an hour to oiling once a day

On literally hundreds of lubricating applications, where manual application of lube oil is involved, the time required to maintain adequate oiling of equipment adds up to surprisingly large amounts. The fact that ordinary lubricating oils tend to run off and dissipate in a relatively short time makes it necessary to repeat the hand oiling operation again and again in the course of the day's work.

A typical example is the case of the manufacturer of small metal stampings, operating a battery of small machines. Using a No. 30 SAE oil, applied by oil cans, it was necessary to oil the bearings of these machines once every hour if the bearing was to be kept cool and the de-

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Carbide gripper and wear plates are standard on this new, rugged, versatile feed.

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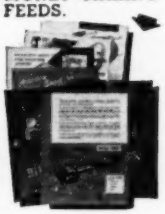


Dickerman

H. E. DICKERMAN MFG. CO.
324-318 Albany Street, Springfield, Mass.

sired production rate maintained on the machine. There was also the problem of splatter and drip from the bearings when the oil was applied and for some time thereafter.

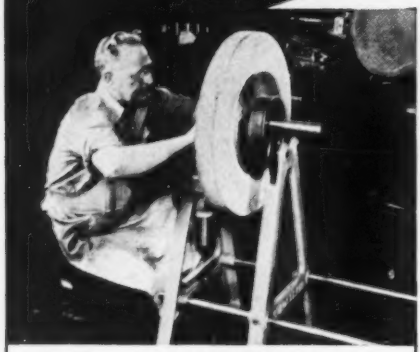
Magnus Kling-Oil, made by the Magnus Chemical Company of Garwood, N.J., is a No. 30 SAE lube oil with the added property of "tackiness." When applied to a bearing, the oil clings to the surface . . . does not drip or splatter, and maintains lubricity for much longer periods.

Kling-Oil was first tried by this manufacturer nearly two years ago. Now it is used exclusively for these machines. One application per day is ample to keep the units functioning at top capacity and maintain cool bearings. Actually, repeated tests have shown that one oiling with Kling-Oil is adequate for well over 24 hours of continuous operation, but the once a day schedule has been adopted for routine maintenance purposes.

IBM tools and dies get high speed heat treatment.

Essential hardening of high speed and high carbon, high chrome steel tools and

Balancing Tools for a Wide Range of Work



Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart below.

CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

FREE DATA

You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin 441.

SUNDSTRAND

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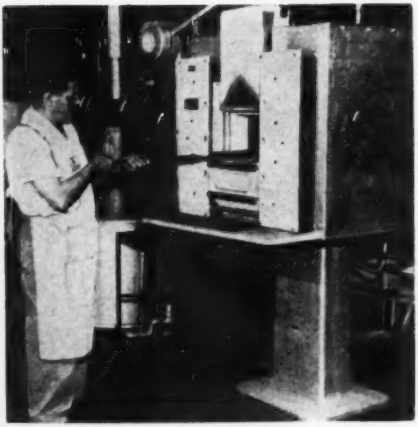


Air brake drill jig at the start of the machining operation. Four-way air valve is in the foreground. The air blow-out hose is at the right upper edge of the drill jig, while coolant hose is at the left.

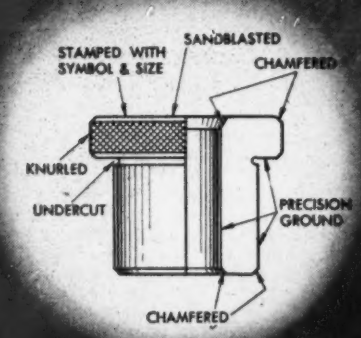
dies at the Poughkeepsie plant of International Business Machines Corp. is accomplished by use of Sentry electric furnaces, Foxboro, Mass. Conditioning of the tools and dies is all important, because they are used for manufacture of IBM electric typewriters, key punches, sorters and proof machines.

Saws, milling cutters, lathe tools and form cutters, blanking and forming dies, and punches are treated at IBM.

End of thin-flanged parts marked during automatic screw machine cycle

A manual marking operation was eliminated in the production of a thin-flanged service part for Ford Motor Co. by installing an automatic marking device in the tailstock of this Conomatic 6-spindle automatic screw machine at station 5. The marking device, recently developed by New Method Steel Stamps, Inc., Dept. B, 147 Jos. Campau, Detroit, advances, stamps a trade mark and identification numbers, retracts and automatically resets ready for the next part—all during the machine cycle.

A total of six job lots of 6,900 parts each were marked with different identification numbers with a single marking unit by interchanging standard New



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3. High finish is ground on inside and outside diameters, and *under the head* for perfect bearing.

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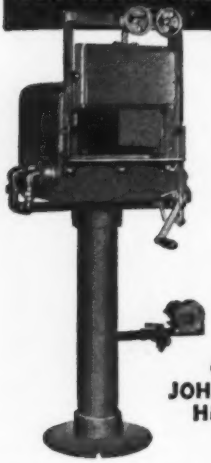

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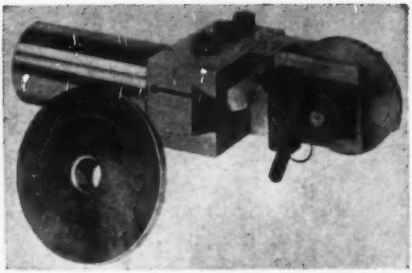


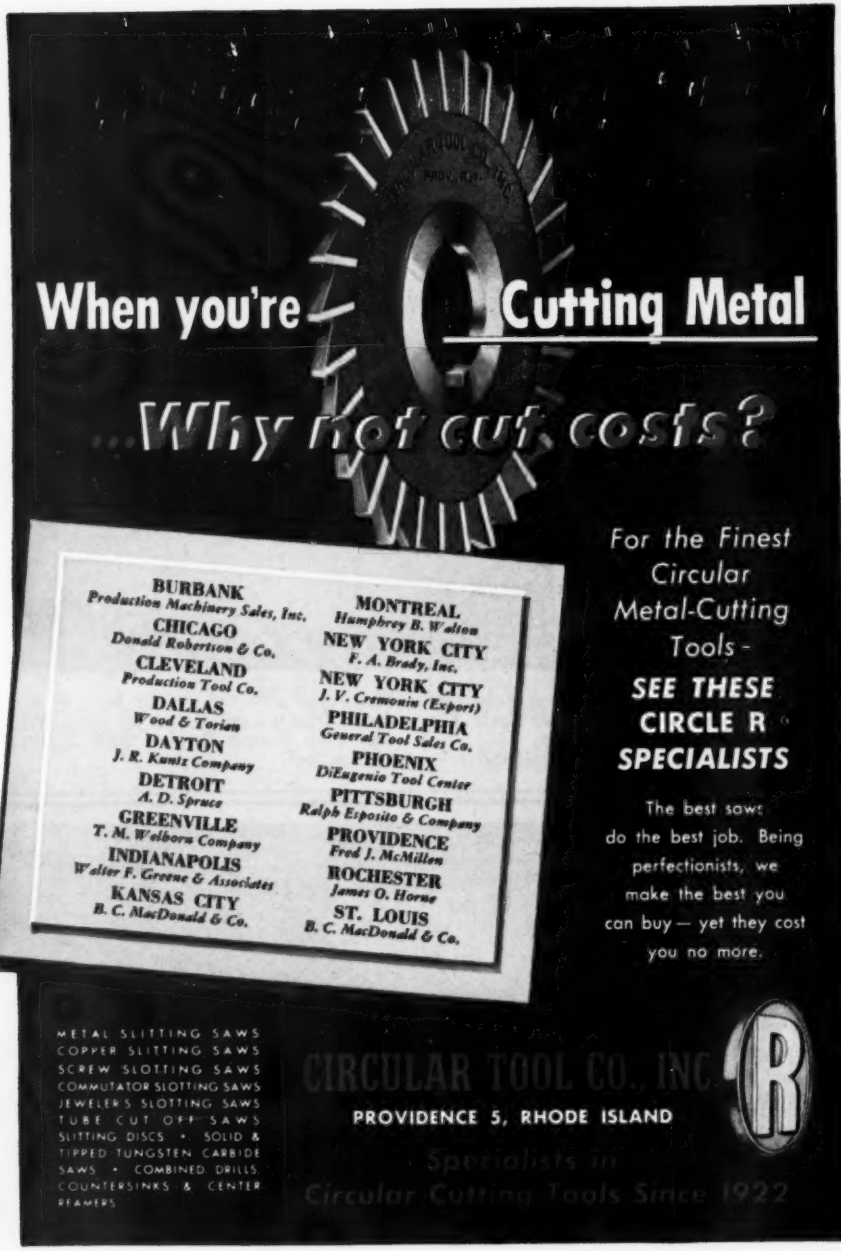
Method roll dies at the end of each production run. Selection of marking radius for each lot was made possible by the adjustable roll die holder head which is mounted on dove-tailed ways.

Thread milling production boosted over 300 per cent by use of tungsten carbide tipped cutters

Thread milling of ball raceways in actuating nuts is being successfully handled with tungsten carbide-tipped cutters at the plant of Vard, Inc., of Pasedena, Calif., nationally known manufacturers of Ball Screw actuators and Hour-Glass wormgear assemblies. Cutters used in this process are produced in various diameters and tooth radii in Vard's own toolroom.

Typical operation is on an SAE 8620 (70-90,000 p.s.i. tensile strength) steel

main-gear actuating ball nut in which the raceway's major diameter is 3.062-inch. Sixteen and three-quarter turns or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The best saws do the best job. Being perfectionists, we make the best you can buy — yet they cost you no more.
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threads are milled in the raceway at 18 i.p.m. (rotation of workpiece), 0.0045" chipload per tooth, 328 r.p.m. (rotation of cutter), and 0.100" depth of cut. Approximately 0.007" stock is left for finish grinding after heat treating. Their carbide cutter turns clockwise while the workpiece is turning counter-clockwise.

Cutter for this operation is of 2.500" diameter having 12 Kennametal K4H teeth of 0.153-0.154" radius, 3° negative radial rake, and 0° axial rake.

Kaukauna drilling and tapping machine used for manufacturing large presses

Lake Erie Engineering Co., Buffalo, N. Y., uses a Kaukauna Model 3040 horizontal drilling and tapping machine, provided with 6' vertical headstock travel and 10' horizontal column travel, for the manufacture of large hydraulic presses.

This machine is used extensively in drilling and tapping operations on the press frame weldments and piston castings. Drill and tap sizes vary from ½" to drill to 3" pipe tap. Rams and pistons for the larger presses require a series of 40 or more holes 1½" in diameter to be drilled in the end of the piece. Because of the ease in positioning, these holes are now drilled in approximately half the time as in the previous setups.

Quite often these same rams and pistons have a 7½" diameter bore 6" to 10" deep. This is easily done by pilot drilling and then boring to size with a fly cut boring tool.

Grinding welds on tractor motor blocks and farm machinery is an every day job at the Oliver and Prowell Implement Co., Lebanon, Tenn. Since their products are heavy, they could not easily move them to a bench grinder. A Stow 1 h.p. 4-speed machine was recommended. Henry Dietz, shop superintendent, says that it has been operating every day since they purchased it in 1943, without trouble.

Shop HINTS

Air Brake Provides Strong, Fast Clamping for Production Drilling

by **H. G. Frommer**

TOOL DESIGNERS have been, and are still, neglecting the possibilities afforded by air brakes for strong and fast clamping. Air brakes are available in a variety of sizes; one line features them giving from 800 lb. to 3,500 lb. force (based on 100 psi air line pressure) at costs ranging approximately from $25 to $45 each. They are less expensive than air cylinders of equal sizes and they do not require oilers or filters as they are designed with the diaphragm principle. The limitation of air brakes is their relatively short stroke, but many applications do not require greater strokes than available in the standard models.

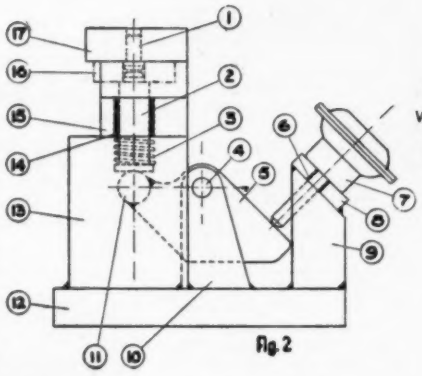

Fig. 2

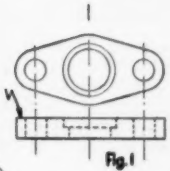
Fig. 1

One such use is pictured here: A flange as shown in figure 1, the outer holes of which have been drilled in a preceding operation, is to be drilled with a step hole through its center. The depth of the larger diameter of the stepped hole must be held from the upper edge of the flange (indicated by an arrow in figure 1) within a few thousandths of an inch. This tolerance requires the locating of the work within the jig from the top edge of the flange.

Jig base (12) is a plate onto which two uprights (13) were welded. Cross plate (15) connects these uprights and has two guide bushings (14). Within these bushings slide two pins (2), the purpose of which is two-fold; the upper ends are turned to provide a very loose fit with the outer holes of the workpiece, flange (16), and the shoulder below the turned ends does the actual clamping of the work against locating plate (17), which is machined on its lower surface. Plate (17) is actually a machined weldment that is bolted to cross plate (15). It also has the two accurate locating pins (1) which are a close fit with the outside holes of the work.

Two more uprights (9) with another cross plate (8) support the air brake (7) which is bolted to plate (8). Bushing (6) guides the air brake plunger. Rocker (5),

supported by the two uprights (10) and hinge pin (4), has a round cross bar (11) which forces pins (2) upward during the clamping operation. Spring (3) returns pins (2) to the starting position after the air pressure is released.

The operations of loading and unloading are fast and simple: In the starting position, pins (2) are located so low that only the upper chamfer of the pins protrudes above the top surface of plate (15). The operator places the workpiece onto plate (15) so that the two outer holes drop over the chamfered ends of pins (2). Since this is a very loose fit, the operator does not have to do any accurate time-consuming positioning. Then, the air valve is turned on; the plunger of the air brake forces rocker (5) against the pins, thereby moving them upward. As the shoulders of pins (2) engage the work, the latter is forced against plate (17) and the accurate locating pins (1) enter the outer holes of the work. Within a split-second the work is accurately located and clamped and the operator can feed the step drill into the cored-out centerhole.

Unclamping is done by reversing the air valve. Pins (2) are forced down by spring (3), the work drops onto plate (15) and the operator inserts the next workpiece, thereby pushing out the completed piece, which slides down a sheet-metal chute behind the jig into a tote box on the floor (chute not shown).

The air valve is connected in such a way that one position is "clamp," the other "unclamp" and the third is "blow-out" through the blow-out hose. This hose is fastened to the jig and removes loose chips. This arrangement eliminates the need for the operator to pick up an air hose.

Insert on power brake dies cuts costs

Temco Aircraft Corp., Dallas, Texas, is using an inexpensive insert on its power brake dies that allows an average saving of more than $1 on every part produced, through the elimination of much hand-forming that normally followed forming on the power brake machines. Rejections, too, are reduced by the insert. It is made of 1/16" or ⅛" scrap steel and designed for use when parts with large holes, cut-outs, or scarfs are being formed.

Normally, power brake pressure will cause a part to flare, if a hole, cut-out, or scarf is located where the bend is made. "Flare" is an increase in the radius of a bend. It occurs in cut-out or scarfed parts because these areas receive less support from bottom dies and, therefore, are less sensitive to top, or radius, die pressure.

To make bends uniform, flared areas formerly were hammered back to correct radius with mallets. Then Carlton M. Smith, a Temco leadman, developed his insert.

It lies across the jaws of the bottom die and is bent to the same radius as the

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on multiple "single-point" form cutting operation in the plant of a large auto manufacturer. IMPARTIAL PRODUCTION TESTS of previous "best" cutting fluid vs. SHEAR-SPEED Soluble Oil were run under *exactly* similar conditions—same machine, same parts, same tool grinding, same coolant flow.

JOB SPECS: 24-tooth transmission gears, 2.5" pitch dia., 1.185" face width, cut two at a time on gear shaper from SAE bar steel, 207-228 BHN.

ACTUAL TEST DATA (averaged)

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OVERALL TOOL LIFE	15,200 parts	26,600 parts	75% improvement
DOWN-TIME PER PART	.0625 min.	.0357 min.	43% improvement
PARTS PER HR. (INC. DOWN-TIME, ETC.)	86	125	45% improvement
CYCLE TIME* (FLOOR-TO-FLOOR)	55 sec.	35 sec.	36% improvement

*Tool life increased despite higher cutting speed.

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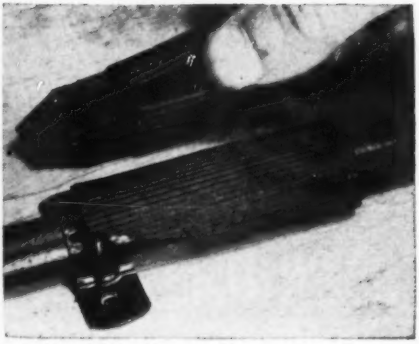
outside of the part that is being formed. The part lies on top of, and is supported by, the insert. This support—around cut-out and scarfed edges—equalizes top die pressure along the entire part and allows a uniform bend.

Power brake operators at Temco use inserts with nine different radii every day. Though they so far have used inserts only on 48″ Verson machines forming parts from 2″ to 36″ in length, the insert may be used on any size brake machine.

Pipe clip holder

by **C. T. Smith**

In the assembly of overhead cranes we enclose much electric wiring inside steel conduit pipes. Pipes are also used for the conveyance of lubricating oil. All pipes are secured to the machine framework by means of saddle clips which straddle the pipes at intervals and are held in place with two screws in each clip. Some of the working positions are awkward and the assembler needs three hands in order to hold clips in place while drilling and inserting the screws.



A simple "third hand" for holding the clips in place has been evolved from a short piece of thick-walled rubber hose. In the photograph, one of the rubber holders is shown in place holding a conduit clip while the other one shows the holder at the working side.

The short piece of hose is cut away for half its diameter a short way down its length, and the diameter is split lengthwise. This lengthwise split is sprung over the pipe, which it grips firmly. The pro-

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jecting half diameter holds the clip firmly in the desired position.

The holder will work in overhead positions, where it is of particular value for holding saddle clips in place so that the holes for the screws may be spotted through the holes in the clip and self-tapping screws inserted directly. The holders avoid fumbling with saddle clips, which were always being dropped. We have no trouble due to holes being drilled the wrong distances apart, since the clips now act as drilling jigs for placing the screw holes.

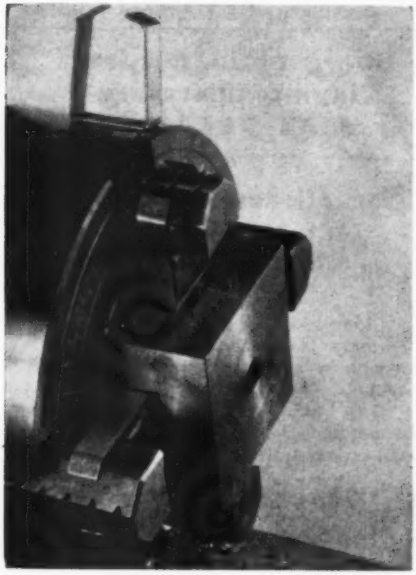
Hose diameters can be selected to suit the pipe diameters, but one holder will embrace a range of pipe sizes. For instance, the ½" bore hose illustrated can be used on pipes from ½" to ⅞" o.d.

Clip-On soft packing

by **F. E. Riley**

When holding flat-sided pieces in the lathe chuck for facing, in the manner shown in the illustration, the corners of the jaw steps dig into the work and mar it. Strips of brass, copper and other soft material can be inserted between jaw steps and work to prevent marring, but these tend to fall out of position during setting of the job in the chuck.

If the soft packing is bent up from strip,



in the manner illustrated, the pieces will stay in place on the jaw, even if no work is gripped therein.

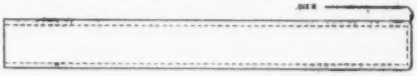
For holding work in the large diameter steps of the chuck jaws, two sets of clip-on packings will have to be made; one set for each step. Once constructed they become permanent lathe accessories.

Break the sharp edge

by **Edward McIntyre**

Mr. Product Engineer, are you fully aware of the expense to American industry connected with "breaking the sharp edge" on component parts of your steel fabricated units as related to shafts and tubing where uniformity and symmetry are desired when establishing o.d. radii and angles?

Diagram shows a torque tube specifying a .016 radius. This radius has no func-



tional relation to any mating part, yet it is shown as a critical dimension. It is well for the product engineer to remember that when his part goes into production, his blue print is the law—it is the last word, and no deviation from print tolerances is permitted. In manufacturing aircraft instruments, a decimal dimension, in all probability, would be limited to a ± .003 tolerance.

To estimate the cost of establishing a .016 radius on a part, the cost of the following factors would have to be considered: tool design; standard tool bit; setup, grinding and inspecting tool bit; identifying and locating tool in crib; maintaining this close tolerance on the machine; production inspection; parts inspection; handling rejected parts on this dimension; directing rejected parts through the material review board; time for process engineer to have this error corrected.

If the product engineer is too busy, the error remains an unnecessary cost to the product. With all due respect to the American engineer and his marvelous achievements, this expensive practice is more universal than one might suppose.

If the desired end is to "break the sharp edge," it would be well to specify: Break the sharp edge to a maximum break, such as could be expected from hand filing. If a more uniform break is required, revert to a chamfer such as a 1/64 x 45°. A chamfer tool is more economical to make and inspect than a radius tool. A

chamfered dimension is faster and easier to maintain than a radius dimension. A chamfer can be checked on the machine. To check a radius to a close tolerance, the nearest comparator must be used.

If product engineers will always ask of themselves these three questions, Can we do it with a file? Will a chamfer do the job? Must I have a radius here? they shall save American industry millions of dollars annually.

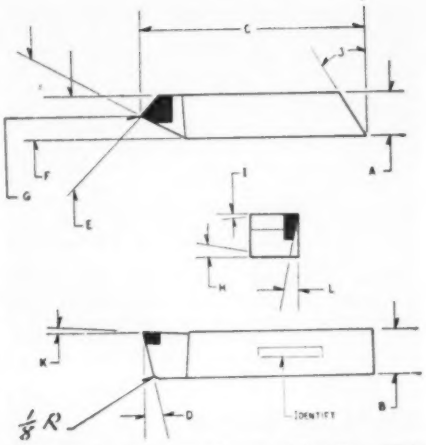
Boring bar cutters standardized

by **Harold D. Rhodenbaugh**

Sketch shows a method of standardizing boring bar bits or cutters that will reduce the cost and establish control over this type of cutter.

Since boring is a universal operation in the fabrication of machined parts, and in most cases is done with a bar of simple construction used in conjunction with a bit or cutter, often too little attention is given to the potential economy through cutter control and cutter grinding.

In many cases the boring cutter regarded as a standard tool bit is slighted by engineers. The grinding of radii and angles on the standard boring cutter is



left up to the operator or jobsetter. This is an expensive error. Especially is this so when decimal tolerance is applied to radii or angles, as is frequently the case in the aircraft instrument program.

The table shows only nine, of fifty, square boring bar bits or cutters. The

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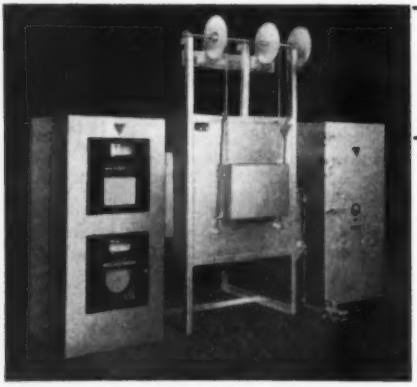

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BORING BITS

Standard Purchased Tool Bits						Grinding Data Standardized								
Style	Grade	A	B	C	WS No.	D	E	F	G	H	I	J	K	L
T.S.	Super X	3/8	3/8	1½	WS 51	7°	30°	55°	.000	7°	7°	30°	6°	6°
"	"	"	"	"	WS 52	"	"	"	.010					
"	"	"	"	"	WS 53	"	"	"	—	—	—	—	—	—
"	"	"	"	"	WS 54	"	"	"	.030	"	"	"	"	"
AL 6	78B 883	3/8	3/8	1½	WS 56	7°	30°	55°	.000	7°	7°	30°	0°	6°
"	"	"	"	"	WS 57	"	"	"	.010	"	"	"	"	"

general application of these cutters is the same. In every case a standard tool bit is used to produce the cutter, yet a study of the chart will show a distinct difference in the grind on the G, or radii, dimension. It may further be noted that spaces were left for the introduction of new grinds to the chart.

All tools shown on the chart are stocked as standard tools and are available for many applications yet each is adaptable to a specific purpose. The WS number shown on the chart identifies the tool.

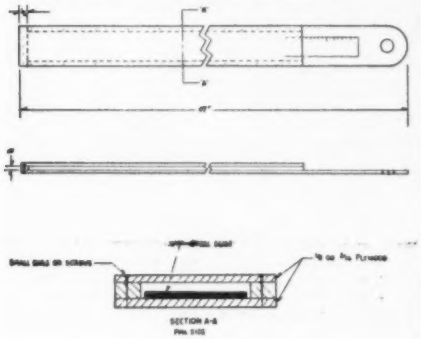
Now, consider the designing cost of T-numbering or specializing each individual boring tool, as shown in table under the old system of a print for each tool. For instance, in listing fifty boring tool cutters, that would be fifty tool prints. Add to this storage space, cost of filing, cost of establishing and maintaining a permanent inventory of tool bits.

Wooden sheath protects scale from damage

by **Roger Isetts**

Many inspection departments and tool-rooms have 36" steel scales for large layout work. They are quite expensive and are subject to damage or loss if left lying around. Illustrated is an easily made protective sheath for storing these scales when not in use.

Made from ⅛" or 3/16" plywood, the sheath itself can either be nailed or screwed together. A coat of stain or shellac will serve as weatherproofing and also improve its appearance. A hole drilled near the top of the sheath allows it to be hung up in a convenient place.



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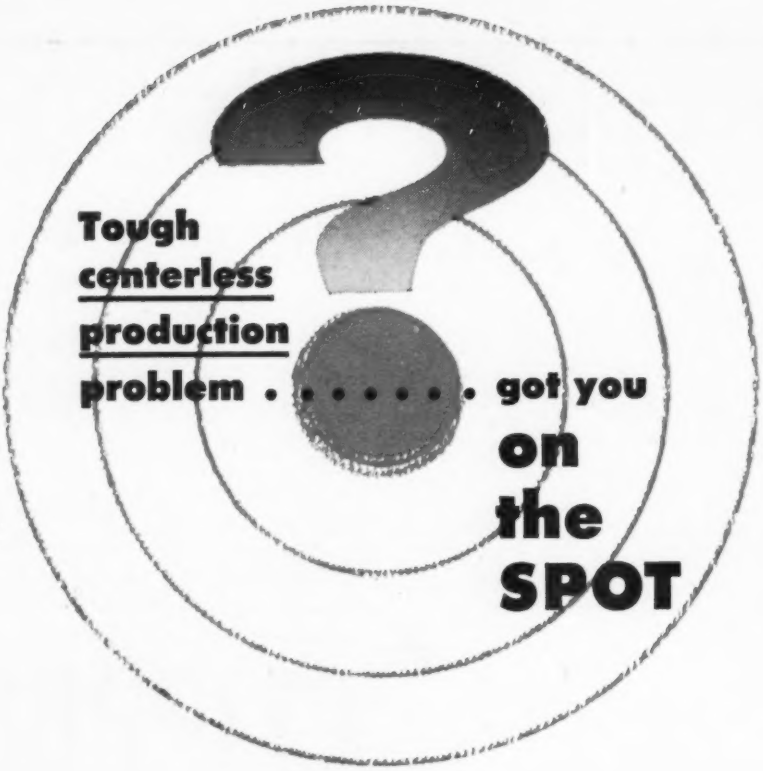

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3 CINCINNATI Grinding Wheels represent 25 years of Cincinnati Milling research and practical experience based on an entirely new approach to grinding wheels—the development of the grinding wheel as a true cutting tool.

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So contact us at once. We'll send one of our expert machinists—men who are Cincinnati Milling-trained and know grinding and grinding machines as well as grinding wheels. He can show you how to get the most out of CINCINNATI Grinding Wheels and help you solve that tough centerless production problem. There is no charge for his service. Write, wire or phone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

How CINCINNATI GRINDING WHEELS Solved Tough Centerless Production Problem

CASE HISTORY No. 217

The job	Thru feed grind 4.2 mortar shells. Material - resistance welded steel tubing SAE 1030-1050 normalized to 75,000 p.s.i. Stock removal - .020"-.015". Tolerances - size .003, finish 75 r.m.s.
The machine	Cincinnati No. 2 Centerless
The problem	Erratic production caused by chatter and burning.
The solution	A Cincinnati Milling machinist, in collaboration with the customer, Thermador Electrical Manufacturing Company of Los Angeles, worked out the solution -- on the job -- using a Cincinnati Wheel from local stock. The wheel prescribed was a Cincinnati 2A60-K5-VN, 20" x 12" x 6". In addition to providing the correct wheel, the Cincinnati expert also recommended changing the type dresser, and adjusted the blade angle, work speed and feed rate. Results -- all troubles were eliminated and production was not only stabilized but increased!

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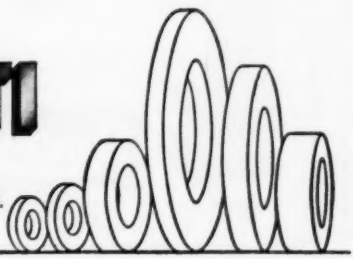
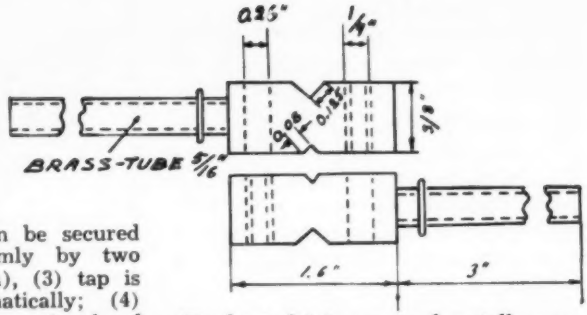
THE CINCINNATI MILLING MACHINE CO.
Cincinnati 9, Ohio



Homemade tap-driver

by **Federico Strasser**

Drawing shows a homemade tap- and reamer-driver which boasts the following features: (1) two centering squares adapt themselves to a wide variety of tap sizes; (2) tap can be secured easily, rapidly and firmly by two thumbscrews (not shown), (3) tap is always centered automatically; (4) light weight of driving arms (made of thin brass tubing) prevents tilting of tap and the resulting inclined threads; (5) short driving arms forestall exertion of too much force, thereby lessening danger of tap breakage.



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A special report by the editors of MACHINE and TOOL BLUE BOOK

Report number 37

Grinding Machines . . . part 11

This is the thirty-seventh in a monthly series of special reports discussing various types of machine tools. Included in this month's special report on grinding machines are:

1. **Abrasive action in surface grinding.**
2. **Descriptions of late model grinding machines.**
3. **Specifications of American-built machines.**

Previously published reports discussed: 1. Thread rolling; 2. Power Press Brakes; 3, 4, 5. Milling Machines; 6. Honing, Lapping, and Superfinishing; 7. Automatic Screw Machines; 8. MAPI Replacement Formula; 9, 10. Chucking Machines, Turret Lathes, Hand Screw Machines; 11. Broaching Machines; 12. Shapers, Slotters, Keyseaters; 13, 14, 15. Lathes; 16. Planers; 17. Gear Making Machines; 18, 19. Boring Machines; 20, 21, 22, 23, 24, 25, 26. Drilling Machines; 27, 28, 29, 30, 31, 32, 33, 34, 35, 36. Grinding Machines.

Abrasive action in surface grinding

By **W. T. McCargo,**
Asst. to Vice-President
The Carborundum Company
Niagara Falls, N. Y.

THERE are four general types of surface grinding machines requiring different wheel shapes, sizes and grades of wheels for similar work, which fall generally into the following categories:

1. Vertical Spindle Rotary Table Grinders
2. Vertical Spindle Reciprocating Table Grinders
3. Horizontal Spindle Rotary Table Grinders
4. Horizontal Spindle Reciprocating Grinders

General rules and wheel selection applying to these various types of grinders may be broken down into two general classifications: (1) vertical spindle, and (2) horizontal spindle.

Vertical spindle grinding

In vertical spindle operations, the important factor influencing wheel selection is the arc and area of contact between the grinding wheel and work pieces. On this type of machine, there is line-to-line contact, which means that the portion of the wheel contacting the work pieces during the grinding oper-

TABLE I

Relationship of Power Consumption to Abrasive Efficiency

Grinder—Blanchard Vertical Spindle Surface Grinder
Material—C1020 C.F.S.
Chuck Load—427 sq. in.
Total Infeed—0.050 in.
Wheel Grade—DA24-H9-V20

Infeed Rate In. per Min.	Metal Removed, In.	Abrasive Loss, In.	Power, Amp.
0.004	0.042	0.008	60
0.016	0.026	0.024	40
0.028	0.019	0.031	50
0.040	0.016	0.034	65

ation is in contact with them continuously. The general rule for wheel selection on this type of application is that the wheels must be coarser, or softer, or both, for efficient operation.

Generally the grain type must be either chemically pure aluminum oxide abrasive or a mixture of grain types such as Carborundum's DA abrasive, which is a mixture of chemically pure and regular aluminum oxide. Structures must be open and grades must be soft within the range of F to J.

Wheels used in vertical spindle grinding must be of the self-dressing type, in which case downfeeds and chuck speeds are critical in terms of the proper wheel action. On most production jobs, downfeeds are seldom in smaller increments than 0.005 in., and are often greater.

On the basis of tests conducted in Carborundum's Mechanical Laboratory, ammeter readings are regarded as an indication of the proper wheel action which gives maximum efficiency. There is a fine balance between wheel grade, downfeed, ammeter reading, and wheel loss, as related to the area of the work pieces, which is commonly referred to as the chuck load. All of these variables must be recorded in terms of efficiency with all conditions constant, with the exception of wheel performance.

Typical abrasive performance on a vertical surface grinder is illustrated in figure 1, which shows "metal removed" as a function of "infeed rate." The amount of metal removed is directly connected with the rate at which the

Figure 1.

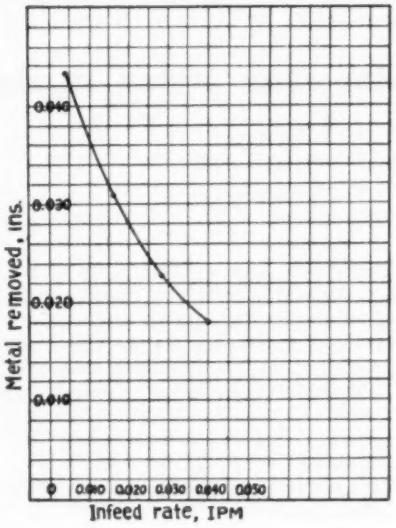


TABLE II

Effect of Grit Size on Metal Removal Rate

Grinder—Blanchard Vertical Spindle Surface Grinder
Material—C1020 C.F.S.
Chuck Load—427 sq. in.
Total Infeed—0.050 in.

Infeed Rate, In. per Min.	Metal Removed, In.		
	DA24-H9-V20	A80-G9-V20	A80-J9-V20
0.004	0.042	0.0140	0.0230
0.016	0.026	0.0050	0.0100
0.028	0.019	0.0035	0.0085
0.040	0.016	0.0030	0.0070

abrasive is fed into the work. At low rates of infeed, a high percentage of metal is removed; as the infeed rate is increased, smaller amounts of metal are removed. At higher infeed rates, greater pressures are produced on the abrasive, and, consequently, it breaks down rapidly and performs less useful work.

The relationship of power consumption to abrasive efficiency is such that the full capacity of the drive motor should be utilized. The most efficient abrasive is one that will maintain a cutting rate sufficient to load the motor to its capacity at all times. A typical performance of wheel grade DA24-H9-V20 is given in table I to illustrate this point. The capacity of the motor is 60-70 amps.

Coarser wheels are used to better advantage in vertical spindle operations than finer grits. The reason for this is that they remove more metal at a faster rate. Table II shows typical performance figures for 24 and 80-grit abrasives. These data show that finer grits are much less efficient than the recommended 24-grit size.

An example of how much work a vertical grinder can do is revealed in table III. Metal removal rate, power consumption and the abrasive costs are given, for two abrasive gradings. The table illustrates that vertical grinders are used primarily for rapid metal removal on high production operations.

The performance of an abrasive depends upon the amount of work that it is called upon to do. Larger work areas require abrasives that are soft acting, while smaller areas can be ground satisfactorily with harder acting abrasives.

The relationship between performance and work area is illustrated in table IV, with a standard grading DA24-G9-V20 used to grind a full chuck load,

TABLE III

Work Capacity of Vertical Spindle Grinding

Metal	Abrasive	METAL REMOVED Cu. In. Per Min.	METAL REMOVED Lb. Per Hr.	POWER, Total H. P. Input	COST OF ABRASIVE, To Remove 1 Cu. In. of Metal
C-1020	DA24-H9-V20	3.89	65.4	41	0.0183
C-1020	DA30-H9-V20	3.07	51.6	28	0.0296

TABLE IV

Influence of Work Area on Abrasive Performance

Machine—Blanchard Surface Grinder
Material—C1020 C.F.S. and Boiler Plate
Total infeed—0.050 in.
Wheel grade—DA24-G9-V20

Infeed Rate In. per Min.	Metal Removed—In. Chuck Load, 427 Sq. in.	Chuck Load, 708 Sq. in.
0.004	0.0390	0.0200
0.008	0.0320	0.0190
0.016	0.0235	0.0145
0.020	0.0210	0.0130
0.028	0.0145	0.0110
0.040	0.0115	0.0090

TABLE V

Segments and Ring Wheels — Vitrified Surfacing — Vertical Spindle

Starting Recommendations for Average Applications

GENERAL PURPOSE

60 MICROINCH AND COARSER FINISH

Soft Steels, Cast Iron

Areas 400 sq. in. and larger DA24-G9-V20
Areas Less than 400 sq. in. DA30-H9-V20

Hardened Steels

Areas 400 sq. inches and larger AA46-F9-V20
Areas Less than 400 sq. inches AA46-G9-V20

10 TO 60 MICROINCH FINISH

Soft Steels, Cast Iron C180-I4-VE
Stainless and Hardened Steel C180-H4-VE

MACHINE KNIVES RESHARPENING

Shear Blade (Flat Surface) AA46-F9-V20
Chipper and Planer (Edge) DA46-I9-V20
Paper DA46-G9-V20

MACHINE KNIVES, MANUFACTURE

Flat Surfaces (Rough Grind) DA36-G9-V20
Flat Surfaces (Finish Grind) AA60-G9-V20
Edge (Finish Grind) DA46-H9-V20

MISCELLANEOUS

Aluminum (Rough Grind) ..... BC16-K4-VE-YA Filled
Aluminum (Finish Grind) ..... BC46-M4-VE-YA Filled
Brass and Bronze BC30-I4-VE
Carbides GC60-F11-VR

TABLE VI

Surface Grinding
Horizontal Spindle and Peripheral Grinding
Reciprocating and Rotary Table Types

Starting Recommendations for Average Applications

Wheel Size—12" to 18" x 3" Maximum Thickness

General Purpose	
Soft Steel, Cast Iron and Hardened Steel	DA46-J6-V11
Steel—Heat Sensitive	AA46-H7-V10
Improved Finish	AA60-H7-V10
Steel—Thin Stock	
Laminations and Saw Stock	DA46-H6-V11

Wheel Size—20" x 3" Maximum Thickness

General Purpose	
Soft Steel, Cast Iron and Hardened Steel	DA46-H6-V11
Increased Stock Removal	DA36-H6-V11
Improved Finish	DA60-H6-V11
Steel—Heat Sensitive	AA46-H7-V10
Improved Finish	AA60-H7-V10

Wheel Size—20" x Over 3" Thickness

General Purpose	
Soft Steel, Cast Iron and Hardened Steel	DA36-G6-V11
Improved Finish	DA46-H6-V11
Steel—Hardened, Heat Sensitive	AA46-G7-V10
Steel—Thin Stock	DA46-H6-V11

Tool Room Wheels

Surface Grinding		
Flat Work		AA46-H7-V10 or DA60-H9-V20
Thin Stock		DA60-F9-V20
Forms—Rough	.010" Radius—	AA 80- J6-V10
Finish	.005" Radius—	AA100-K6-V10
Sharp Corners	.003" Radius—	AA150-K6-V10
.003" Radius		AA220-K6-V10

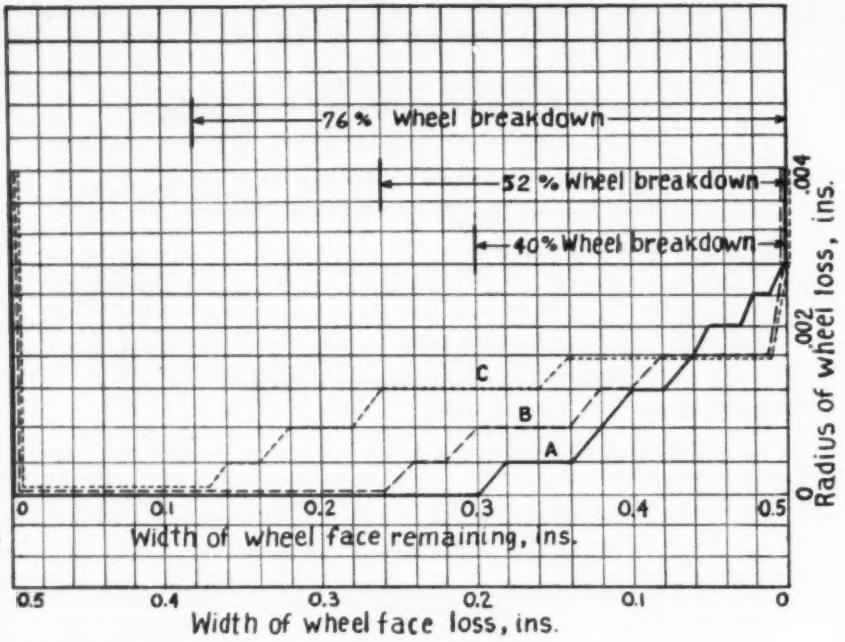
708 sq. in., and a medium chuck load, 427 sq. in. The difference in the metal removed shows a well defined improvement in abrasive performance, in the case of the medium chuck load.

In summary, the wheel must be coarser and softer than wheels used on other types of surface grinding; and it must be self-dressing for efficient operation.

Typical starting recommendations for average applications are shown in table V.

Horizontal spindle grinding

In this type of surface grinding, the arc and area of contact differs enough to change the grade requirements considerably. All of the roughing cut is imposed upon the advancing edge or side of the grinding wheel. This requires a wheel that will form a radius and a slight taper on the face equivalent to the amount of stock being removed each time the wheel traverses the work. A



2. Measuring wheel breakdown by the contour method.

flat area must be maintained on the grinding face of the wheel in order to impart the proper finish, free of burn, to the work pieces.

The measurement of wheel efficiency then seems to be a matter of maintaining the proper radius, taper, and flat surface formed on the wheel face through the grinding action, and the relationship of one to the other.

Grain sizes from 36 grit to 150 grit and grade ranges from G to L are used in horizontal spindle grinding, depending upon the wheel diameter, width of wheel face and area of chuck load. Wheels used in this type of grinding must maintain form with a minimum of wheel loss for maximum efficiency. Grain types required are the same as those required for vertical spindle surface grinding, with the exception that on all soft stock production items ground on the rotary table machine, regular aluminum oxide is often used.

For form grinding, fine grain sizes up to 150 grit, dense structures, and harder grades are required with a resultant reduction in downfeed and therefore a decrease in production rate.

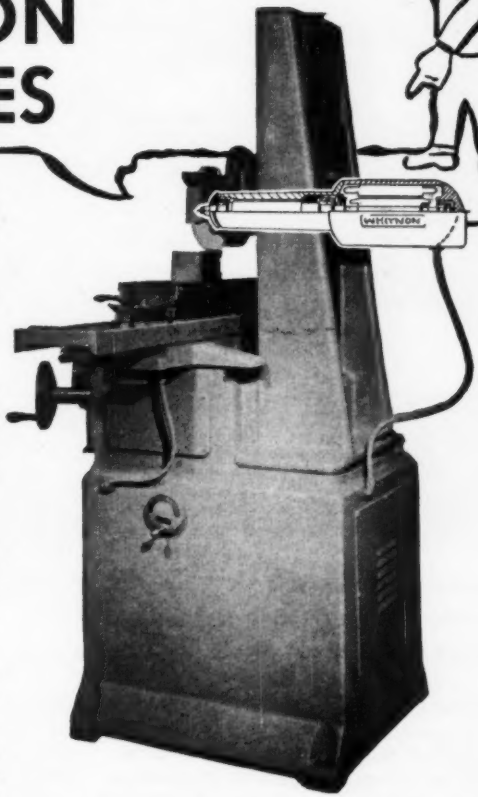
Most of the work on the horizontal spindle reciprocating table type grinder is performed dry, with a large portion of the work being toolroom grinding. In Carborundum's Mechanical Laboratory, a great deal of experimental work has been done on the reciprocating table type machines and the principal measurement of efficiency—other than stock removal rate, accuracy, and finish—is the wheel face contour, which is measured by projecting a template contour

Take the advise of one who knows!

When you replace your old Spindle or when you order a new Surface Grinder

specify

WHITNON SPINDLES



Heavily spring preloaded to keep spindle radially and axially rigid. — Stock Spindles are one full horse power, 3600 RPM enclosed motor, 220/440 volts, sealed in lubrication.

Sparks out fast leaving an excellent finish. — The only spindle rigid enough for crush dressing and perfect contour grinding.

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Inquire today, specifying machine, volt age, frequency and phase.

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3. Vertical spindle grinding is used primarily for rapid metal removal on high production operations. Grinding wheels employed are coarser and softer than wheels used in horizontal spindle grinding.

of the wheel face (amplified 50:1) on an optical comparator.

A typical breakdown pattern of three wheels is shown in figure 2. The wheel contour is made up of three parts: a radius on the advancing edge, a taper form which represents the amount of stock being removed per pass, and a flat portion which generally does the finishing. The ideal wheel breaks to this form naturally and holds this form for a long period of time, resulting in greater wheel efficiency.

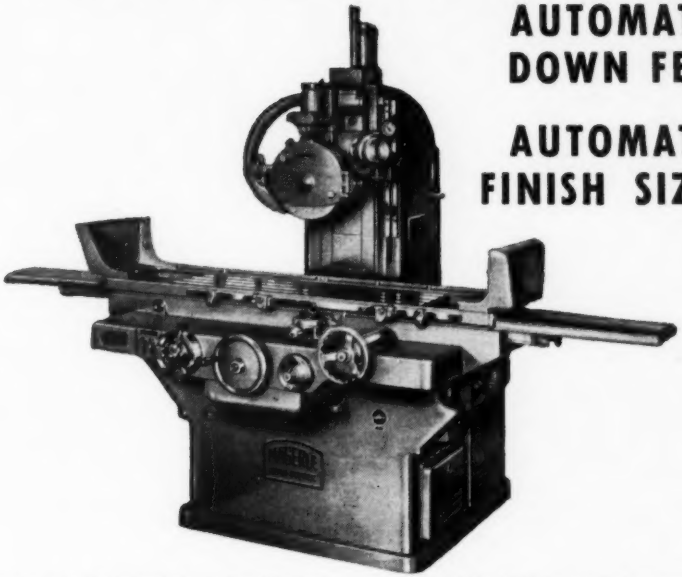
It is apparent that wheel A is the most efficient of the three, practically twice that of wheel C, which is the least efficient.

This breakdown pattern can be compared in principle to gang cutting tool setups where one tool is set ahead of another, as illustrated in figure 3. Such an arrangement permits the taking of heavier cuts in one pass, than possible with a single tool, thereby eliminating operations. If the tapered portion of the grinding wheel face is equivalent to the amount of stock to be removed, the setup is similar to setting one cutting tool

MÄGERLE (SWISS) HYDRAULIC SURFACE GRINDERS

AUTOMATIC DOWN FEED

AUTOMATIC FINISH SIZING



- A work measuring instrument shows the difference between work size and required final size during operation.
- The automatic feeding and sizing is powered by a separate electrical unit.
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- The machine requires no attendance during the grinding operation.
- Finishes within .0002 are secured on repeated chuck loadings automatically.
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- Available with infinitely variable grinding wheel speed.
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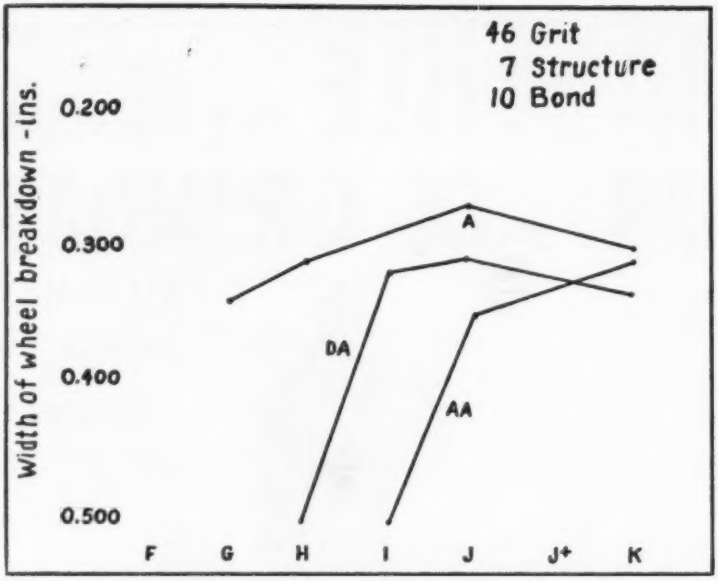


4. Comparison of grain types for form holding and efficiency. Based on width of wheel breakdown.

Machine: G & L Horizontal Surface Grinder
Wheel: 8 in. x ½ in. x 1½ in.
Steel: 4 in. x 8 in. HYCC—Rockwell C-59
Dressing: Open
Procedure: 1 pass at 0.002 in. and 1 pass at 0.001 in. without dressing.
Wheel Speed: 6000 EFPM
Table Speed: 20 FPM
Cross Feed: 0.0625 in.

ahead of another, so that a number of cutting tools are available to do the work, each tool taking a portion of the cut.

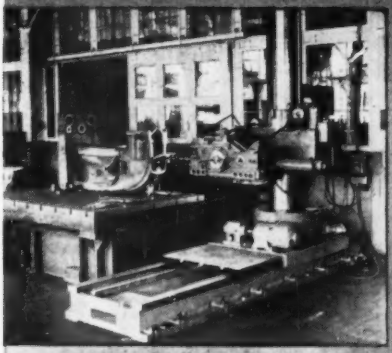
The formed face on the grinding wheel thus permits greater stock removal—or the same stock removal for a longer period of time—than would be the case if the wheel were not formed.

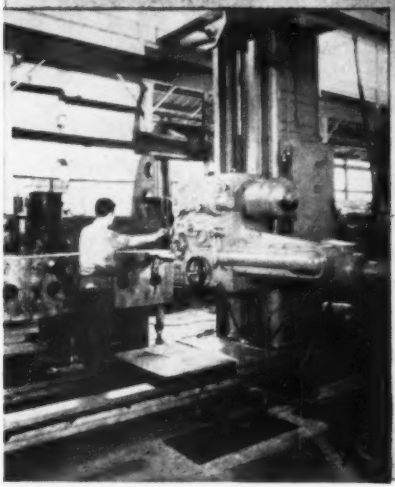
The breakdown of the wheel face is a direct measure of many characteristics of wheel performance. A few of them are: (1) number of pieces per dressing, (2) form holding ability, and (3) free cutting qualities.

How this is applied practically is illustrated in figure 4. This graph defines the contour breakdown of the wheel and also shows the relationship between wheels made with regular A grain, chemically pure AA grain, and DA grain, which is a mixture of regular and chemically pure grain.

The graph shows that AA grain breaks down more rapidly—grade for grade—than regular or DA. This means that it is better suited to grind pieces

Horizontal Drilling Machines by Kaukauna AT WORK....





Performing quick, accurate drilling operations on press frame parts—drilling, fixture boring, tapping operations on milling machine columns—drilling all four parts of a tractor frame on a repetitive production line basis—these are the types of jobs illustrated, showing Kaukauna Horizontal Drilling Machines at work. The time and labor savings are of course apparent—elimination of expensive crane lifts, reduction in handling time, inexpensive tooling.

As illustrated, there is a Kaukauna Horizontal Drilling Machine in a size suitable for any class of work from small, high production jobs to extremely large work pieces. These extremely versatile machines make for greater work simplification and may be used to advantage in your shop for driving boring fixtures, drilling, reaming, boring, counterboring, tapping and spot-facing operations.

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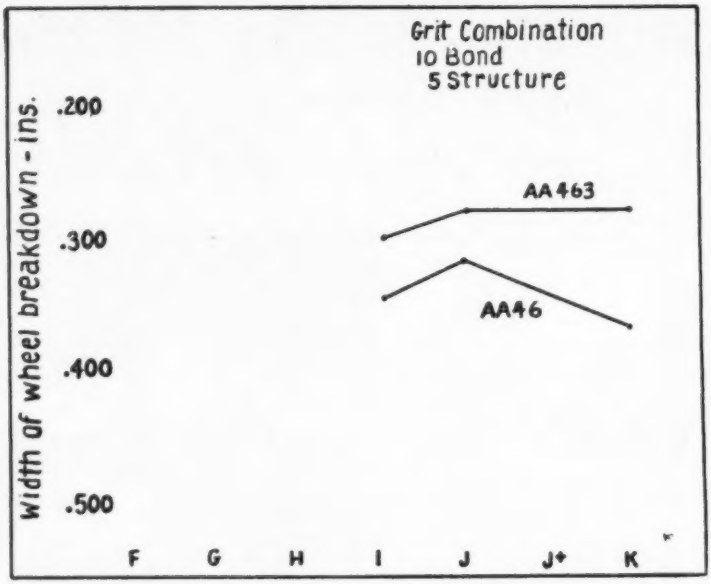

5. Comparison of grit combination. Based on width of wheel breakdown.

Procedure: 1 pass at 0.002 in. and1 pass at 0.001 in. without dressing.
Wheel Speed: 6000 SFM
Table Speed: 20 FPM
Cross Feed: 0.0625 in.
Machine: G & L Horizontal Surface Grinder
Wheel: 8 in. x ½ in. x 1½ in.
Steel: 4 in. x 8 in. HYCC—Rockwell C-59
Dressing: Open

that require a minimum heat during grinding. "A" grain would be more advantageously used on jobs where high grinding pressures are developed, because it shows ability to withstand breakdown. DA would be used more effectively on operations that fall in between the other grains.

The use of grit combinations in horizontal surface grinding is helpful on many operations. The advantage of a grit combination is that it will maintain form better than a straight grit. It will also produce some of the advantages that are associated with fine grits and some that are associated with coarse grits.

A comparison of the performance of a straight 46-grit with that of a combination 463 grit is shown in figure 5. The curves indicate clearly the advantages of using combination grits where a cool-cutting medium is desired to protect the work piece against the generation of heat.

Table VI contains a number of gen-

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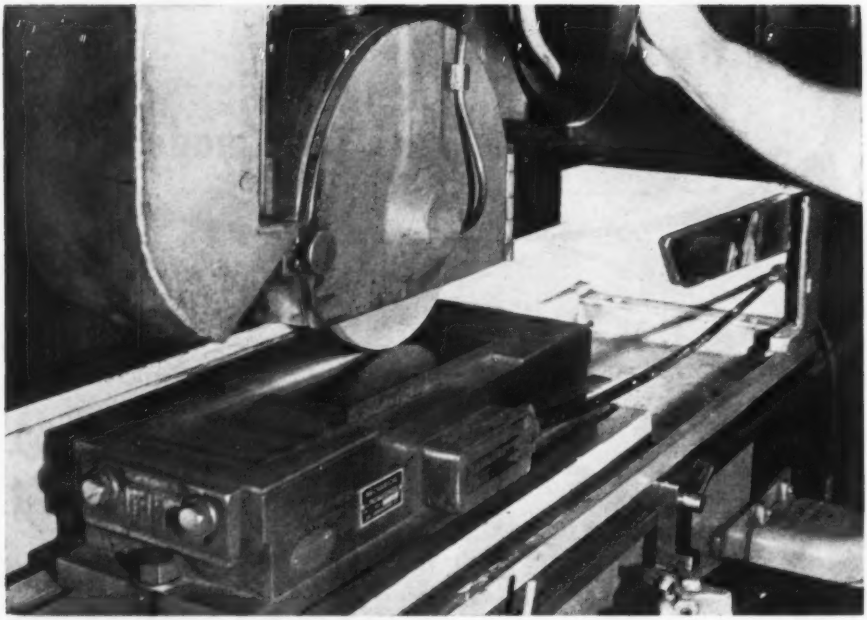


In horizontal spindle grinding, the roughing cut is imposed on the advancing edge or side of the wheel, which changes the basis for wheel selection as compared with the requirements of vertical spindle grinding.

eral recommendations as to wheel grades for various sizes and types of horizontal spindle surface grinding operations.

Wheel contour is also affected by grinding speeds and feeds, and the optimum speed and feed required for each operation can be determined by the wheel contour. An example of the variety of conditions that can be imposed upon a grinding wheel is revealed by the fact that a downfeed as high as 0.200 in. and a crossfeed of 0.010 in. with a traverse rate of 20 fpm can be made with a wheel such as Carborundum's DA60-H9-V20 on die steel HYCC hardened to Rockwell C-59. This can be done with good operating efficiency.

The same wheel is also capable of taking very light cuts such as a downfeed of 0.010 in. with a crossfeed of 1/32 in. and a table speed of 35-50 fpm with good operating efficiency.

With such a variety of speeds and feeds that can be imposed upon grinding wheels, there are necessarily some wheel grades that will perform more efficiently on a particular operation than other grades. In order to determine this, efficiency must be measured by some means. The wheel contour breakdown method has been proven to be an effective means of measuring wheel efficiencies under any set of conditions. This can be expanded to measure generally any characteristic of a grinding wheel designed for use on a horizontal spindle surface grinder.

The author does not advocate the use of any particular downfeed, crossfeed,

or traverse rate, since the speeds and feeds selected in grinding have been more or less controversial between traverse grinding and corner wheel grinding, and it is not intended here to recommend any speeds and feeds which constitute optimum grinding conditions. However, the contour breakdown is still a measurement regardless of the speeds and feeds, and by this method the proper selection of wheels for any speed or feed and any material ground can be made.

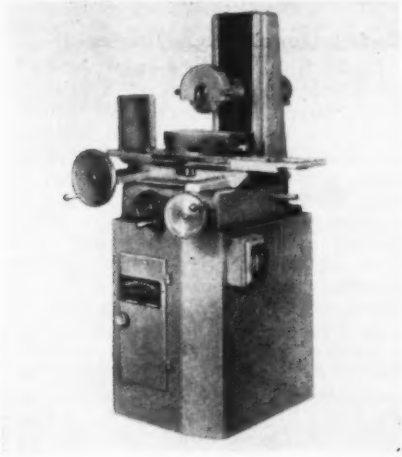
The End.

Description of late model grinding machines

Bridgeport surface grinder

The Bridgeport Surf-Ace grinder, a product of American Machinery Co., 315 Asylum St., Bridgeport, Conn., incorporates many features of larger machines, plus features designed to permit sustained grinding accuracy. It is adapted for crush grinding ¾" and 1" wide wheels. The entire machine, including base, is of cast iron construction.

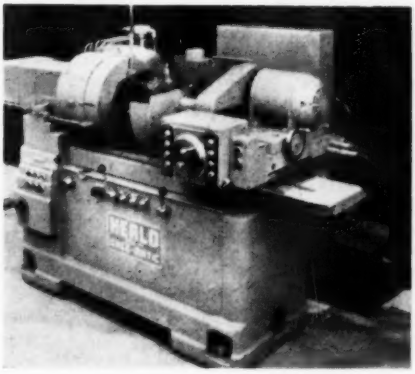
The machine has a 13½" clearance under the wheel and a 6½"x16" table travel. It can be supplied with either a Pope, Ex-Cell-O, or Whitnon precision cartridge type spindle, and incorporates a cast iron base and hand scraped vee and flat ways. Designed to accommodate a standard 7"x½"x1¼" wheel, it utilizes handwheels which are readily accessible for fast grinding graduated in .0001" increments.



Heald internal grinder

Precision internal grinding machines, chuck type, manufactured by Heald Machine Co., Worcester, Mass., are designed for mass production. They feature a fast automatic cycle with automatic size control. On the Size-Matic, the wheel is automatically advanced at a constant rate until size is reached. The Gage-Matic machine uses solid plug gages that automatically test the hole size until final size is obtained. Size-Matic operation can be obtained on the Gage-Matic machine by turning a selector switch. Taper grinding is provided for on the Size-Matic machines.

The models 170 and 171 are used for small work and are identical except that the model 170 is used in battery installations, powered by a central supply system, while each model 171 has its own power systems. The models 271 (shown) and 272 are for larger work and are identical except that the model 272 is longer.



Continental chaser and cut-off wheel grinder

This machine, made by Continental Machine Co., Chicago, Ill., is used to grind chasers for threading up to 8 inch pipe, and also for sharpening cut-off wheels immediately upon dulling.

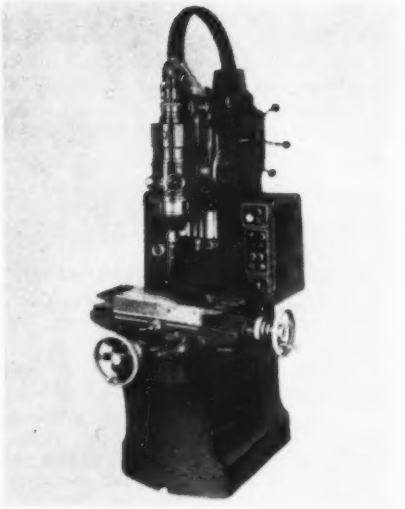
Chasers can be ground down to within ½ inch of end. It is calibrated and can be set for any angle of bevel. Smooth lever action for passing chaser across

wheel face: adjustable base to compensate for grinding wheel wear.

Cut-off wheel grinder has adjustable set screw stop to ensure precisely equal length bevels on both sides of blade. Wheel is fed to face of grinding wheel by operating lever. Handles 4½ to 8½ inch diameter wheels. Sharpens smaller wheels with adaptors which are available.

Moore jig grinder fast, accurate

Greater accuracy, speed for die holes, both straight and tapered, is a feature of the jig grinder manufactured by Moore Special Tool Co., Inc., 740 Union Ave., Bridgeport 7, Conn. "Trick" operations performed on the grinder, such as grinding contours—radii and tangents or chordal surfaces—were always done through special setups. Now in-



corporating features of several previous models, the latest style makes standard practice of these trick operations.

A new angular and indexing device built into the main spindle and the newly developed slot grinding attachment permit the quick, accurate grinding of any contour, regular or irregular. This new angular indexing device eliminates the necessity for setting work on a rotary table, except for angular surfaces.

Rowbottom cam grinder

Model No. 328 cam grinder, made by Rowbottom Machine Co., Waterbury, Conn., supplements model No. 325 cam miller for the production of hardened and ground cams. To lighten the wheel slide without reducing rigidity, an aluminum alloys casting is used in the grinder slide. On all sliding surfaces ground and handscraped steel liners bear against the cast iron column. Spindles are provided with a reciprocating mechanism which is disconnected with a hand lever for bottom grinding a groove. Two models are available: model A for commercial work, and model B for steep angle cam slot grinding.

The cross slide attachment and back

Lepel's 3 new

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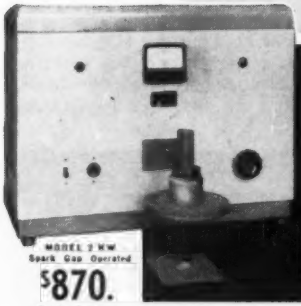

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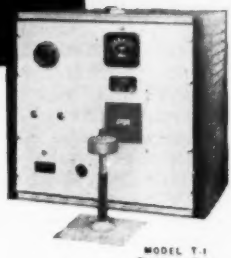

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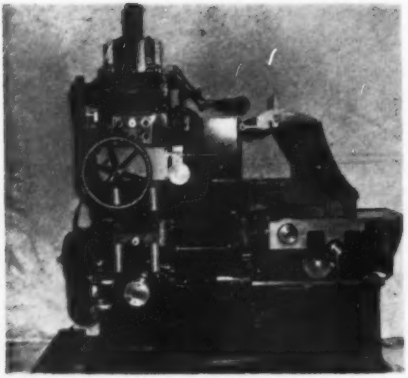


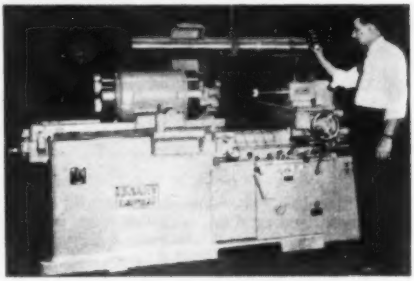
gears of the cam milling machines can be used on both models of the cam grinding machine.

B & S universal grinder

Many features mark this Brown & Sharpe, No. 1 universal grinding machine. Some of them include: unit type wheel spindle with antifriction bearings and sealed lubrication; practical wheel speeds of 2500, 3000 and 3600 r.p.m. which provide the maximum in efficiency and economy; independently driven, instantly available internal grinding spindle furnished as standard equipment (choice of spindle for 16,500, 24,000 or 35,000 r.p.m.); hydraulic table drive providing smooth table movement with speeds infinitely variable from 3" to 150" per minute; variable speed headstock drive, 60 to 600 r.p.m.; universal turret providing 4" adjustment of wheel spindle head at right angles or parallel to wheel slide; easily removed tanks for hydraulic and coolant systems; fine cross feed adjustable to .0001" on work diameter, providing extremely accurate sizing; positive stops on cross feed for either external or internal grinding; kneehole for operator's convenience and comfort; conformity of machine to J.I.C. electrical and hydraulic standards; available additional equipment to augment the flexibility of the machine for economical small or moderate lot production.

Bryant No. 1416 noted internal grinder

Bryant Chucking Grinder Co., Springfield, Vt., has specialized in internal grinders for 40 years and has developed a line to meet both size and application requirements.

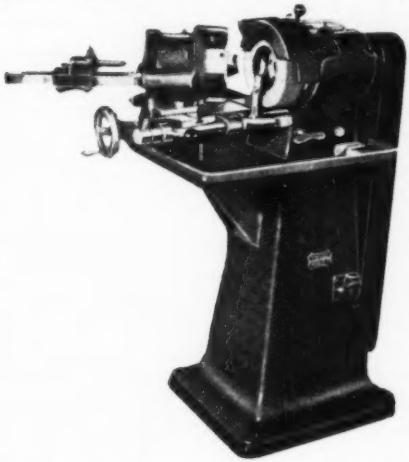


The No. 1416, noted for its versatility, is used for grinding bores in long parts such as machine tool work spindles. It is not designed for grinding bores longer than 9", but the work table is arranged so that long parts may be held either in the standard hollow work spindle and steadyrest or in a special fixture arranged so that a spindle can be assembled to run in its own bearings while the bore is being ground. The workhead base is of the swiveling type, providing for grinding a maximum included angle of 30°. It may also be pivoted in a reverse direction for grinding reverse tapers up to 10° included angle. To facilitate loading and gaging long parts, a hydraulic retracting mechanism is provided for the wheelslide, so that the cross slide may be moved 8" to the rear. An adjustable chuck can be provided at

each end of the workhead to chuck long pieces. The work spindle is driven by a variable speed hydraulic motor. Wheelheads are easily interchanged and the length of grinding stroke readily set.

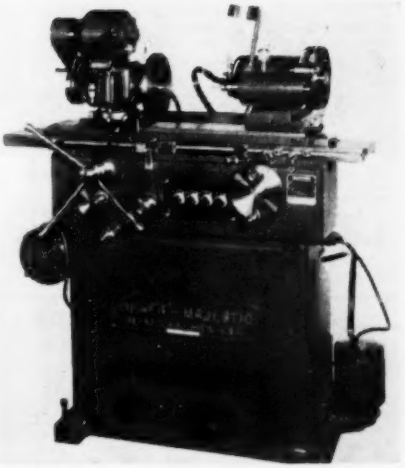
Oliver No. 510 drill pointer

The No. 510 drill pointer, manufactured by Oliver Instrument Co., Adrian, Mich., covers the entire ranges of drill sizes, ¼" to 3" and 2-4 lips. It grinds all point angles from 82° to 160° included,



has a variable cam that is easily adjustable to provide correct clearance for special materials and has positive drive, quick-acting clutch to chuck. All main shafts, including spindle, are equipped with anti-friction bearings. There is a powerful, single belt drive to the spindle and operating mechanism.

The type of point produced provides a gradually increasing clearance toward the center of the drill, a form which has been characterized by drilling specialists as "theoretically correct." This clearance may be varied to suit the job.



Parker-Majestic double purpose

The Parker-Majestic Model "B" grinder, made by Parker-Majestic, Inc., 147 Jos. Campau Ave., Detroit 7, Mich., is a two-purpose tool that is quickly changed for either internal or external operation by a quickly installed attachment. This meets the requirements of a great percentage of internal grinding.

The work head is equipped with Parker precision bearings for great precision. It will swivel 90° on either side of center for grinding angles and for other chucking operations. The work spindle is hollow and the nose is ground to take No. 4 N.S. collets. Head collets ave available up to ⅝". By using these or special speed chucks or adaptors, this machine is suited for short or long run production jobs.

The spindle and motor are mounted on the spindle bracket, for a compact, vibration-free unit. Spindles are available for speeds ranging from 10,000 to 30,000 r.p.m. and are designed for various uses.

Specifications of American built machines

Continental Machine Co.	Chicago 14, Ill.
Chaser and Cut-off Wheel Grinder	A dual purpose machine. Grinds chasers up to 8 inch pipe. Can be ground down to within ½ inch of end. Other side of machine sharpens cut-off wheels. Handles 4½ to 8½ in. dia wheels.

Parker-Majestic, Inc. — Detroit 7, Mich.

Type and Model	Capacity	Table Work Surface	Collet and Hole Dia.	Speeds of work head
Internal Grinder	10" Swing over table; 12" Table Travel	5" x 33½"; Work head Swivel, 90°; table swivel, 5°. 2¼" Travel of cross slide	Collet capacity (No. 4 N. S.) 1/32" to ⅜"; Hole diameter through spindle 13/16"	175, 325, 425 r. p. m.
Internal and External Grinder	24" Between Centers 24" Table Travel; 10" Swing over table	5" x 42"; Travel of cross slide, 2¼"	Collet cap. (No. 4 N. S.) 1/32" to ⅜"; Hole dia. through spindle, 15/16"	100, 225, 300 r. p. m.

American Machinery Co. — Bridgeport, Conn.

Type and Model	Capacity	Table Work Surface	Wheel	Horsepower
Surface Grinder	6"x16"x13½"; Trans.=6"; Long.=16"; Vert.=13½" under 7" wheel	6½" x 13"	7" x ½" x 1¼" hole	¾ hp., 3500 r. p. m.

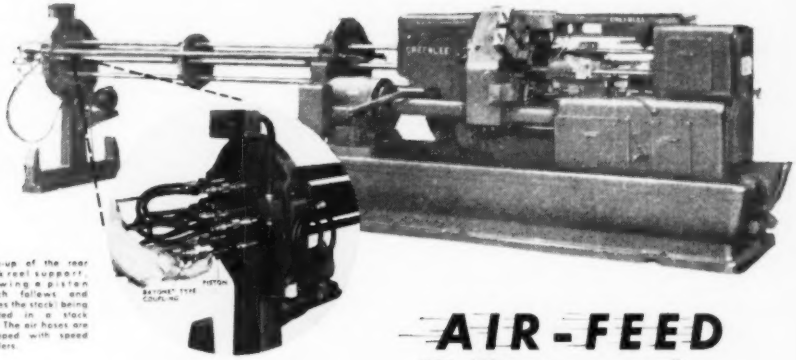
Oliver Instrument Co. — Adrian, Mich.

Type and Model	Capacity	Wheel	Horsepower and Speeds	Remarks
Drill Pointer No. 510	1/16" to 3" dia. either 2 or 4 flute, straight or taper shank. Three flute drills to 2 ¾"	Cup type: 9" x 2" x 5"	1 hp.; 1750 r.p.m.	Universal carriage permits a variation in point angles from 82 to 160°.
No. 21 Bench Type	3-32 to ½" 2-lip rt. hand drills. Special collet increases capacity to No. 57 drill.	5" x 2" x ⅝" cup type, ½" face	¼ hp.	Bench space: 18" x 20"
Drill Point Thinner	2 lip ⅛" to 3" dia.	Rubber wheel 6" x ⅛" x 1¼" and one 6" x ½" x 1¼" wheel	½ hp.; 3600 r.p.m.	Special trunion supports available for thinning 3 or 4 flute drills.

Moore Special Tool Co. — Bridgeport 7, Conn.

Type and Model	Capacity	Table Travel	S=Spindle G=Grinding Capacity	Speeds
Jig Grinder	10" x 19" table size	16½" long.; 10½" crosswise	S=10" spindle to column. G=⅛" to 5" with grinding wheels; 1/64" to ⅛" with diamond mandrels.	Spindle Speeds: 90, 120, 180, 240; Grinding speeds: 12,000 to 16,000 —3 heads

GREENLEE *Automatics*



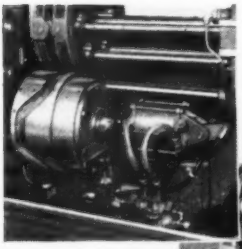
Close-up of the rear stock reel support, showing a piston (which follows and pushes the stock being inserted in a stock tube. The air hoses are equipped with speed couplers.

AIR-FEED

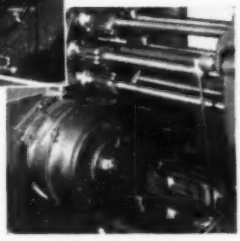
(PNEUMATIC STOCK FEED)

- FEEDS OUT STOCK TO 16½"
- PROVIDES MULTIPLE FEED-OUT
- ELIMINATES STOCK SCORING
- REDUCES STOCK REEL NOISE
- ELIMINATES STOCK PUSHERS
- ELIMINATES FEED-OUT CAMS

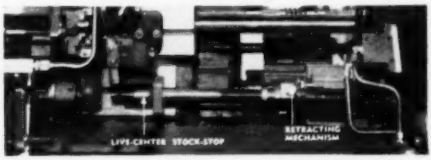
This method of feeding out stock was developed primarily for the many screw machine jobs that require either multiple feed-out arrangements, greater feed-out length than the conventional mechanical arrangement will permit, or for machining parts made from ground stock where pusher marks would be objectionable. It can be adapted to all 1" and 1¼" GREENLEE Automatics.



Left: One method of opening and closing the collets for multiple feed-out. The air cylinder, controlled by a plate cam on the cam drum, actuates the collet-operating rings. Various arrangements can be made, depending on the requirements of the particular job being set up.



Right: Simplification of the feed cam drum possible with air feed, where the collets are to be opened by the conventional mechanical arrangement between the 6th and 1st positions. Feed-out is usually against a standard fixed stock stop in such cases.



Above: A method used for feeding out stock during the machining cycle. The stock is fed out against an adjustable live-center stock-stop arrangement. When the collet jaws are closed, the live-center retracts and permits the stock to rotate freely and index to the next position.

Write for Free Literature

GREENLEE

GREENLEE BROS. & CO., 1832 MASON AVE., ROCKFORD, ILL.

The Heald Machine Co. — Worcester, Mass.

Type and Model	Swing Over Table	L= Length Hole Can be Ground D=Dia. Hole Can be Ground	R.P.M. of Workhead	Remarks
Internal Grinders Model 271 Plain	18"	L= 8"; D=⅛" to 7½"	133, 200, 266, 400 r.p.m.	Grinding Speed= 0-15 f.p.m.
Model 271 Tool Room	22"	L=8"; D=⅛" to 14"	do	do
Model 272 Plain	18"	L=14"; D=⅛" to 7½"	do	do
Mode 272 Tool Room	22"	L=14"; D=⅛" to 14½"	do	do
Model 274 Universal	26"	L=14"; D=⅛" to 12"	40 to 550 r.p.m.	do
Model 75-A Chucker	15½"	L=6"; D=½" to 9¾"	160, 240, 320, 480 r.p.m.	T=Taule Speeds= Manual
Model 172 Gap Chucker	36" (Inside chuck guard)	L=11"; D=1" to 14"	70, 105, 140, 210 r.p.m.	T=0 to 18 f.p.m.
Model 174 Gap Chucker	42" (Inside chuck guard)	L=11"; D=1" to 20"	41, 62, 82, 123 r.p.m.	do
Model 74 Chucker	28"	L=15"; D=1" to 20"	do	do
Model 50 Planetary	17⅜" over table 10 21/32"— 10 13/32" overslide	L=7⅝", 10", 11", 15", 15¾", 18", 23" D=1⅛", 2⅜", 3", 4½"	do	T=0 to 8½ f.p.m.
Model 180 Precision	Outside diameter of work off center 1" to 3"	L=2½"; D=¾"		T=0-20 f.p.m.
Model 181	do	do		T=0-35 f.p.m.
Model 281	8" max.	L=4"; D=¾"	-	T=0-25 f.p.m.

Brown & Sharpe Mfg. Co. — Providence, R. I.

Type and Model	Capacity S=Swing Over Table D=Dist. Between Centers	Dist. Centerline Work to Centerline Ext. Grinding Spindle	Wheel	Spindle Speeds, R.P.M. I=Internal E=External
Universal Grinding Machine No. 1	S= 10"; D=20" nominal, 22¾" max.	11" max.; 2" min.	10" x ⅝" or ½" x 3"	E=2500, 3000, 3600; 1½ h.p. I=24,000; 1 h.p.
No. 2	S=14" D=30" nominal, 33¾" max.	15½" max.; 3½" min.	14" x 1" or 1½" x 5"	E=1900, 2000, 2400; 3 h.p. I=16,500; 1 h.p.
No. 3	S=14"; D=40" and 43⅜"	do	do	do
No. 4	S=14"; D=60" and 63⅜"	do	do	do
Plain Grinding No. 5 3" x 18"	S=3-21/32"; D=18"	8⅝" max.; 4¾" min.	14" x ⅝" or 2" x 5"	Work Speeds=202, 319, 505, 800 r.p.m.

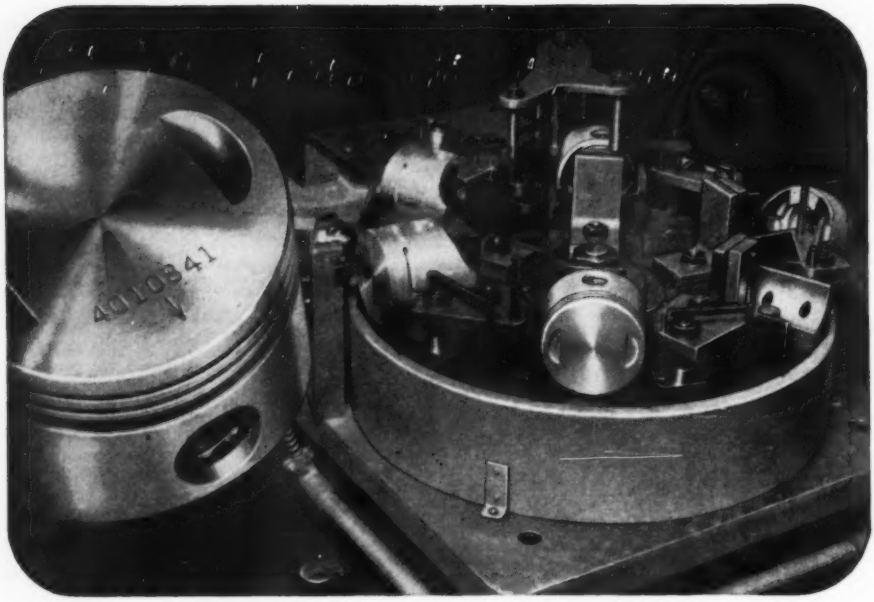
Bryant Chucking Grinder Co. — Springfield, Vt.

Type and Model	T=Total Swing G=Grinding Stroke	Max. Traverse Stroke	R.P.M. of Work Spindle	Remarks
Internal Grinder No. 1209	T=9"; G=0" to 3"	6"	1200 r.p.m.	Will grind min. and max. bore size ¼" to 3"
No. 2209	T=9"; G=¾" Max. depth of hole =1½"	do	do	do
No. 3216	T=16"; G=6"	15"	140-200-280-400 r.p.m.	Wheel Spindle Speeds up to 100,000 may be used.
No. 1109	T=9"; G=0" to 3½"	6"	250 to 2400 r.p.m.	do Workhead adjustable to 45° will grind up to 90° inc. angle
No. 1116	T=16"; G=8"	20"	100 to 1000 r.p.m.	do
No. 1126	T=26", 30" or 40" G=12"	do	80 to 800	Workhead adjustable to 15° workhead slide travel 16"
No. 1409-W Two-Spindle	T=9"; G=3½"	6"	Two Hi-Frequency Wheelheads up to 100,000 r.p.m.	Aux. slide will traverse-grind inc. angle 50° to 90°
No. 1316	T=16"; G=8"	20"	do Table movement-9½"	Workhead adjustable to 45° to grind inc. angle of 90°
No. 1326	T=26", 30", 40" G=12"	do	80 to 800 r.p.m.	Angular adjustment depends on tooling
No. 1416 For Long Work	T=16"; G=8"	do	173 to 622 r.p.m.	Machine adaptable to special workheads
No. 1460	T=60"; G=16"	21"	15, 25, 35 and 50 r.p.m.	do Cross adjustment of workhead, 30"
Contour Grinders No. 16-16	T=16"; Wheel Slide Travel=16"	Max. grinding travel=13"	150, 225, 300, 425 r.p.m.	
No. 16-38	T=38"; Wheel Slide Travel=12½"	Max. grinding travel=9"	do	
No. 16-A-16	T=16"; Wheel Slide Travel=16"	13"	do	
No. 16-A-38	T=38"; Wheel Slide Travel=12½"	9"	do	
No. 24-26	T=26"; Grinding Length=16"	19"	70, 90, 135, 180 or 60 to 200	
No. 24-36	T=36"; Grinding Length=16"	do	do	
No. 24-L-26	T=26"; Grinding Length=24"	27"	do	
No. 24-L-36	T=36"; Grinding Length=24"	do	do	

Rowbottom Machine Co. — Waterbury, Conn.

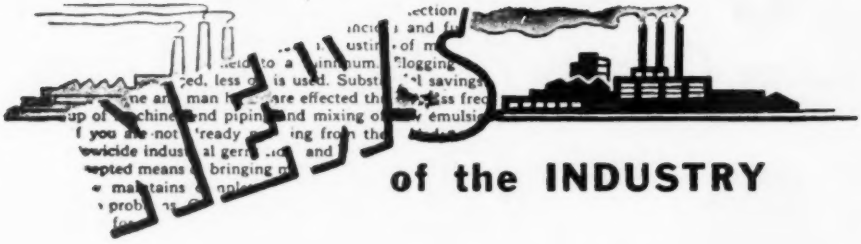
Model No. 328 Cam Grinder. Available in two models. Model A for commercial cam work with hvy. duty spindle for wheels up to 4". Wheel speeds are 5500 and 10,000 r.p.m. Range is from 9 to 70 seconds per rev.

Model B for steep angle cam slot grinding. Wheel is 2" dia., Speed 10,000 r.p.m.; 15 to 60 seconds per rev. of work.



LEADING *AUTOMOTIVE* MANUFACTURERS Save Time and Money with Noblewest HIGH SPEED PRODUCTION MARKING MACHINES

Model 342 (illustrated above) is another fine example of Noblewest's ability to provide industry with high speed marking equipment for part numbering, trade marking, or date coding. This model was especially designed for marking and ejecting approximately 2500 pistons per hour with absolute uniformity of impression. Basic model (right) can be tooled for marking many sizes and shapes of component parts in metal, plastic, hard rubber and wood. Whatever your marking needs, Noblewest makes the machines, marking dies, and work-holding fixtures to do the job faster, better, at lower cost. And remember, Noblewest Roll-Marking is *permanent* marking—*good for the life of your product.* For complete details, write Noble & Westbrook Mfg. Co., 9 Westbrook St., East Hartford 8, Connecticut.



Industrial Exposition of the American Society of Tool Engineers at Convention Center, Philadelphia, April 26 to 30 Inclusive

BEGINNING APRIL 26 and running through the 30th, the ASTE tool show will be held in Convention Hall, Philadelphia. It promises to be one of the largest and most successful yet to be held, according to advance notices.

Filling the hall during those days will be the top engineers, production managers and purchasing agents of thousands of companies throughout the country. Those men will want to know the newest in equipment and how it might fit in with their plans for the new programs they'll inaugurate during the coming year. On hand to aid these men will be engineering specialists, supplied by the exhibiting manufacturers, to show the guests how they might use these items to increase their company's production standards. Every conceivable product that aids production and reduces expense will be on exhibit to give the visiting executives ideas in planning improved products at lesser cost.

Stainless steel pioneer retires

L. Gerald Firth, the man who introduced stainless steel to America, and internationally known pioneer and authority on specialty steels and sintered carbides, has retired as vice president and director of research for Firth Sterling Inc., Pittsburgh, Pa., after 39 years of service with the company.

L. Gerald Firth

Mr. Firth witnessed the first pouring of a stainless steel ingot at Thomas Firth & Sons in Sheffield, England in 1913, and brought the formula and process of Harry Brearley's invention to Firth Sterling in McKeesport, Pa., early the following year. Mr. Firth's theory, which was tested and proved correct, was that by sufficiently lowering the carbon content of the metal, a grade of stainless steel could be obtained which would be stainless without hardening. This was the genesis of the well-known "stainless iron," now known as type 410.

Born in England in 1886, Mr. Firth attended Uppingham School and Cambridge

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University. In 1910 he joined Thos. Firth & Sons in Sheffield, England, where he was employed in their Tinsley Tool Steel Plant. In 1918 he permanently settled in Pittsburgh, and became works manager of Firth Sterling. From 1933 to 1947 Mr. Firth served as president and general manager of the company, and was largely responsible for many contributions to the tool and die steel industry.

Atlanta warehouse announced by Williams

J. H. Williams & Co., 400 Vulcan St., Buffalo 7, New York, recently decided to establish a warehouse in Atlanta, Ga. It will be located at 1855 Cheshire Bridge Road, N.E. (Buford Highway).

Sufficient floor space is being arranged for stocking all popular sizes and patterns of tools in the Williams line including: carbon and alloy wrenches of all types, detachable sockets and drivers, impact sockets and accessories, tool holders and setup accessories, "C" clamps, hoist hooks, eye bolts, chain pipe tongs and vises, pliers, screw drivers, punches, chisels, soft-face and ball pein hammers.

Motch and Merryweather cutting tool division moved to new quarters

The cutting tool manufacturing division of the Motch and Merryweather Machinery Co., Cleveland 13, Ohio, has moved to larger quarters in the company's plant on East 222nd St.

This building was originally planned to accommodate the used machinery divi-

VALUABLE DATA on CARBIDE REAMER SHARPENING

Yours Free!

This new Shop Manual, issued by The Staples Tool Co., provides valuable information on carbide-tipped reamer conditioning. Manual includes data on chamfer size . . . recommended clearance angles . . . method of O.D. and face of flute repair . . . special sharpening techniques for specific applications . . . diamond wheel requirements . . . other tips to improve your tool servicing technique.

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For maximum tool economy, specify Staples Carbide-Tipped Circular Tools for reaming, core drilling, spotfacing, counterboring and end milling jobs. Standard tools from stock - special tools designed to your requirements. Write for details and tool catalog.

THE STAPLES TOOL COMPANY, Cincinnati 25, Ohio
Distributors in Major Cities
Staples CARBIDE-TIPPED CUTTING TOOLS
A complete line of Circular Carbide Tipped Cutting Tools
Expansion Reamers — Special Tools

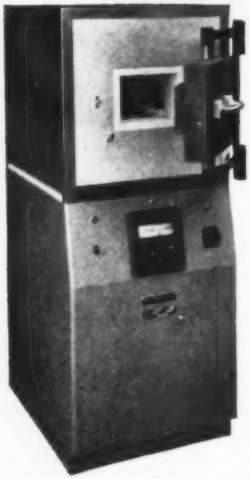
sion. When the need for expansion of the cutting tool division became evident, plans were made to enlarge and modernize the used machinery plant to house the cutting tool section as well. Manager of the cutting tool manufacturing division is **D. M. Hallier.**

Located at the new address are the manufacturing, sales and service departments. The service department has facilities for the complete servicing of circular saw blades.

A. F. Davis welding award

At the 34th annual meeting of the American Society, held in Cleveland, Ohio, recently, in conjunction with the National Metal Exposition, awards were presented for the A. F. Davis undergraduate welding award program. **Roger C. Waugh** and **Otto P. Eberlein** of Cornell University received the $200 first award for their paper, "Penetration Factors in Metallic Arc Welding," which was published in the May, 1953, issue of the Cornell Engineer. The $150 second award

A NEW FURNACE



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Electric Heat Treating

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For Precision Production and Lab. Work

This new Huppert Model "K-R" is ruggedly constructed to meet severest production requirements, yet offers a high degree of accuracy for laboratory experimentation. Complete with transformer, contactor, switch box, Huppert Infitrol and indicating electronic temperature controller. All connections factory installed. Shipped ready for operation.

Write today for literature on complete line of Huppert furnaces and ovens in floor and table models.

Model No.	Inside Dimensions			K.W.	Prices Single Phase	
	Wide	High	Deep		220 volt	440 volt
K-R 668	6"	6"	9"	2	$ 710.00	$ 770.00
K-R 6613	6"	6"	13"	3.5	800.00	860.00
K-R 8613	8"	6"	13"	5	990.00	1,050.00
K-R 10813	10"	8"	13"	8	1,240.00	1,370.00
K-R 10818	10"	8"	18"	12	1,450.00	1,580.00

K. H. HUPPERT CO.

6845 Cottage Grove Avenue
Chicago 37, Illinois

Manufacturers of Electric Furnaces and Ovens

went to **Wayne Jacobs** and **Charles Marshall** of the University of Wisconsin for "A Comparison of the Quality of Weldments Prepared by Different Welding Processes," published in the Wisconsin Engineer. These awards are made annually by the American Welding Society for the best papers on welding published in undergraduate magazines or papers.

Gilbert T. Bowman, gas and Nordstrom valve products manager of Rockwell Mfg. Co., Pittsburgh, Pa., has been named

G. T. Bowman

O. W. Barnett

to the newly created post of manager, products department, of the meter and valve division. Succeeding him as Nordstrom valve products manager is **O. W. Barnett,** former manager of Nordstrom valve distributor sales. **George A. Cunningham,** former assistant gas products manager, has been named gas products manager.

David Reid, Jr. has been appointed manager, abrasive and bond plants, at Norton Co., Worcester, Mass., to replace **Albert E. Hall** who retired Nov. 30. **Robert G. Clarke,** who was assistant superintendent, succeeds Reid as superintendent, abrasive and bond plants.

G. A. Cunningham

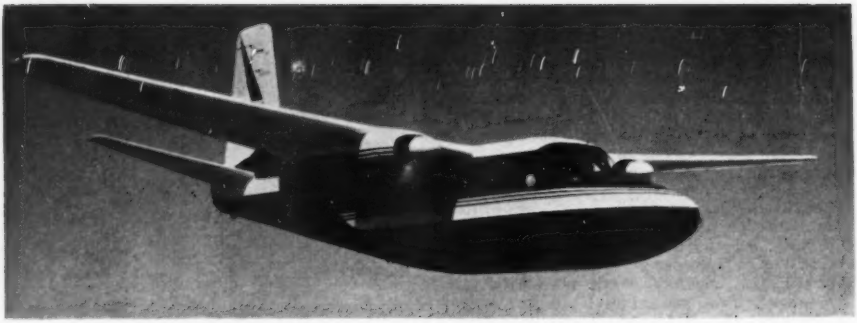
David Reid, Jr.

Kennametal's plant expansion affords improved production setup

RECENTLY completed at the Latrobe, Pa., plant of Kennametal Inc., producer of tungsten and titanium carbide products and specialties, is a new shop building measuring 96 by 200 feet, half of which contains a second story. Affording 28,800 square feet of new production area, the facility will be used to increase manufacturing space with the first floor used to house several departments.

Moving into the new building will be Kennametal's special tool, mechanical development, die making, grinding, inspection, shipping, salvage and finished stock inventory departments. The second floor will contain facilities for the assembly of shipping boxes, locker rooms, etc. Space being vacated in the present shipping and grinding department will be utilized for additional general office space.

Discussing equipment layout of Kennametal's new plant addition are: (left to right) **F. J. Lennon,** general superintendent, **Bennett Burgoon, Jr.,** sales manager—metalworking division, and in foreground, **William J. Truxal,** methods engineer.



The Jones & Lamson Machine Co., Springfield, Vt., has purchased a new Aero Commander airplane to facilitate travel for its sales and engineering personnel, its executives, and customers. The new plane is a seven-place, high wing, tricycle type craft, with a cruising speed of about 180 mph and a range of 1000 miles with a 30 minute reserve. Night flying instruments and the latest two way communication and navigation equipment are incorporated. The twin engines are geared 260 hp Lycomings. A graphic demonstration of the plane's dependability was a 1160 mile flight—Oklahoma City to Washington, D.C.—recently. One propeller was removed from the ship for this flight, and the Commander took off, flew, and landed with only one engine. The trip averaged 147 mph. Some of the reasoning behind the decision to buy the plane included the facts that 6,834 people came to the home office during the past 12 months, and in the first nine months of 1953, J&L travel needs had piled up nearly a quarter of a million miles of travel—60,000 by air, over 60,000 by rail, and over 110,000 by auto.

Landis publishes booklet commemorating 50th anniversary

The Landis Machine Co., Waynesboro, Pa., manufacturers of equipment for cutting, grinding and rolling threads—both internal and external, ⅛" to 20"—recently published an attractive booklet entitled "Landis Men and Machines," to commemorate their 50th anniversary.

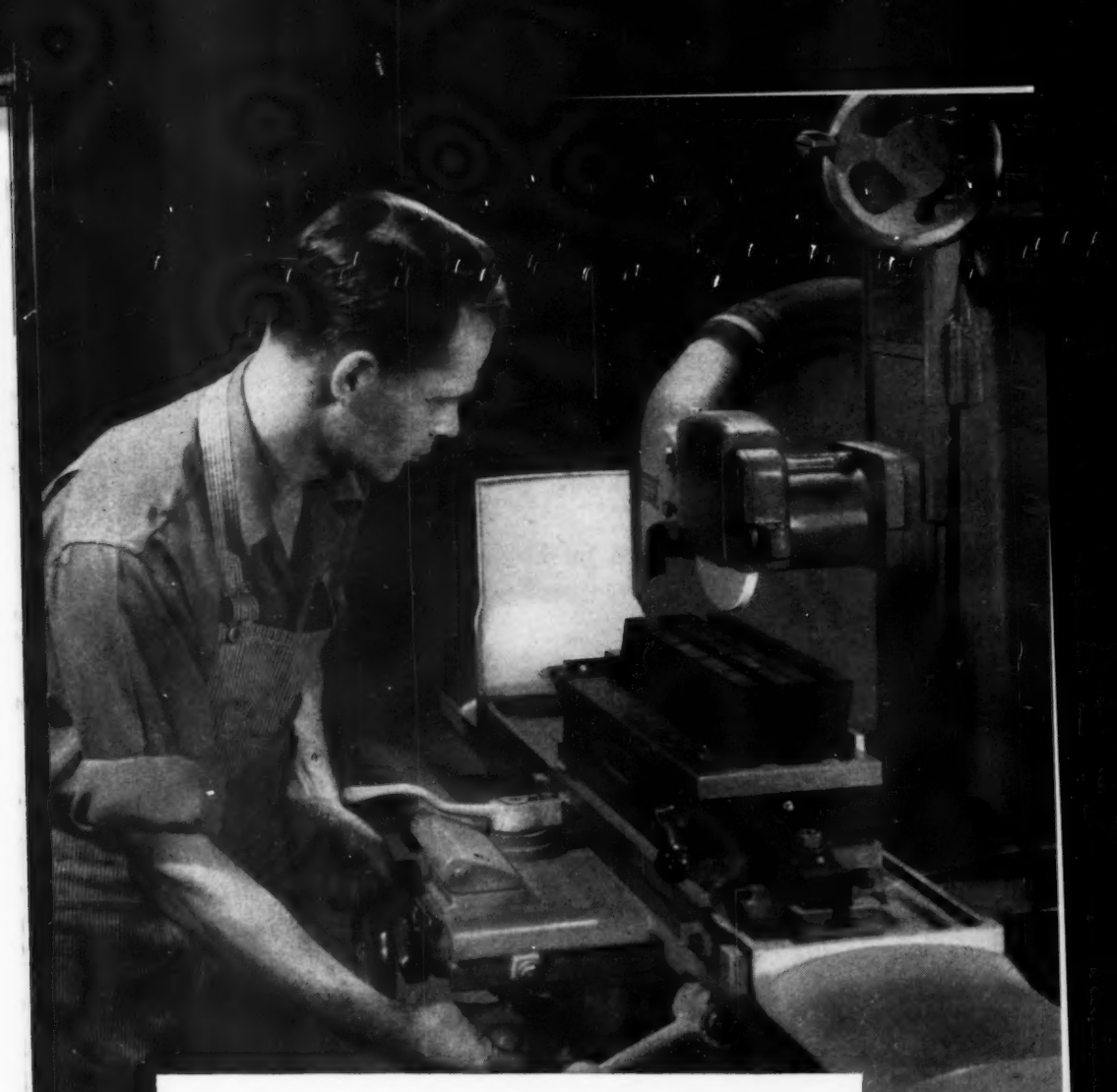
According to an account of the firm's progress, the start was not made in 1903 when the company was organized, but in 1887 when A. B. Landis, then employed by the Geiser Mfg. Co., Waynesboro, Pa., developed his first thread cutting die head. This employed a tangential chaser which, while representing a radical departure from the then accepted design for thread chasers, constituted a basic design principle from which they have never parted.

Currently with the die head development by A. B. Landis, a brother, F. F. Landis, also employed by Geiser, designed and built a cylindrical grinding machine. In 1890, A. B. and F. F. Landis resigned their positions with Geiser and formed a partnership known as Landis Brothers for the purpose of commercializing their inventions. In 1897 a fire destroyed most of the plant. In 1903 the Landis Machine Co., with exclusive rights to manufacture threading equipment, was organized. The first building had 7600 sq. ft.; today space exceeds 350,000 sq. ft.

Tool lease program at Kearney & Trecker promises far-reaching significance

Realizing that American business is face to face with the toughest kind of sales competition it has experienced in 15 years, Kearney & Trecker Corp., Milwaukee, Wis., formally announced Jan. 18, at Chicago, that they were inaugurating a tool lease program.

One of the main reasons given for this action was the opinion that ultimately this pressure will compel all industry to survey its manufacturing facilities for the purpose of rooting out obsolete and inefficient equipment. They believe that not to do so will likely



For the "Super" Finishing Touch . . .

. . . **Brown & Sharpe Surface Grinding Machines.** Exceptional finishes with quick spark-out are assured by rigid construction of these top producers. Their extreme ease of operation and reliable performance have earned the respect of metalworkers everywhere. They set up quickly and adapt readily to the job at hand . . all controls are within easy reach. For maximum versatility and excellence of finish, investigate *both* sizes of these surface grinders. Write to Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

Brown & Sharpe B·S

find many lingering, only to die on the vine. Machine tools facilities, of course, constitute the critical nerve center of manufacturing efficiency, yet there is an appalling indifference to the creeping obsolescence which reliable studies show to be affecting 16 basic industries using metalworking equipment, it is claimed.

Hoping to help others as well as themselves, K & T propose to sponsor and aggressively promote on a national basis this carefully conceived and tested tool lease program. It will be the broadest opportunity to modernize and reequip their plants and test modern machine tools at their best, that machine tool users have ever had.

Having pioneered and tested it since 1949, the Wisconsin corporation promises the plan will have a sweeping and significant effect on nearly all phases of the metalworking industry. For a more complete coverage, read the March MACHINE and TOOL BLUE BOOK.

Brown & Sharpe wins award for hiring handicapped

Henry D. Sharpe, Jr. (left), president of the Brown & Sharpe Mfg. Co., Providence, R.I., receives a certificate of appreciation from American Legion officials in recognition of the company's record for employment of 400 veterans who have had some degree of physical handicap. In presenting the citation, **Robert F. Bergeon** (right), department commander, stated that the company "helped raise the morale of these persons by giving them a chance to prove that their physical handicaps are not job handicaps"; assisting at the presentation ceremony is **John F. Radikin,** department employment chairman.

SPECIFICATIONS

Size 9" x 16"

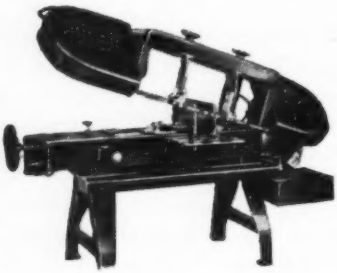
Blade Size ¾"x.032x 11'6"

Floor Space 20" x 66"

Blade Travel 60, 90 and 120 ft. per minute

Swivel Vise 45 degrees in either direction

Wt. Appr. 500 lbs.



For BIG Savings at little cost

. . . investigate this new Model H hinge-type saw, the economy model in W. F. Wells & Sons' line of metal cutting equipment. One-piece frame lowers hydraulically. Coolant system and other accessories available. Send for literature today.

W. F. WELLS & SONS
THREE RIVERS, MICHIGAN

ACCO products

CAMPBELL Abrasive Cutters

New... Low Cost

No. 223 Wet Abrasive Cutting Machine

Fast, clean, close tolerance cuts of hardest alloys and all other metals. Won't work-harden material.

FEATURES

1. Wheel Guides for more accurate cuts . . . reduces wheel flutter
2. Separate Coolant Tank . . . large capacity . . . may be easily removed for cleaning
3. Five Inch Wheel Flange for wheel economy
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5. Automatic Coolant Pump Operation
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"Write for Principles of Abrasive Cutting"

ACCO

CAMPBELL MACHINE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

CAMPBELL Abrasive Cutters and Nibblers

937 Connecticut Ave., Bridgeport, Conn.

Lempco Products, Inc., Bedford, Ohio, has announced that **V. R. Roy**, chief engineer, has been joined by **H. B. Van Auken** as his assistant. **Frank Vasarhely** has been appointed as chief tool engineer. Prior to his joining Lempco in 1950 Vasarhely had spent over 30 years in tool, die and machine design with Warner & Swasey Co., Paramount Tool Co., Columbia Axle and The Miller and Taylor Co., all of Cleveland. Mr. Roy has had extensive experience in automotive service equipment design and Van Auken is a specialist in screw machine attachment and hydraulic mechanism design.

V. R. Roy

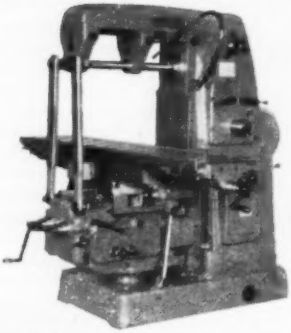
Frank Vasarhely

CERVINIA 4

Universal Milling Machine

DELIVERIES prompt

COST very low



SPARE PARTS available

SERVICE nationwide

SPECIFICATIONS: MORSE TAPER NST No. 50 • WORKING SURFACE 67" x 15¾" • POWER FEED RANGES: Longitudinal 47¼", Cross 13¾", Vertical 19" • 24 FEEDS: Range 3/64" to 18" per minute • RAPID TRAVERSE: 60" per minute • 20 SPINDLE SPEEDS: Range 16 to 1000 rpm MOTOR 8 HP • **For further information, write or call: MISAL MACHINERY, INC.**

ENGINE LATHES | RADIAL DRILLS | TURRET LATHES | **MISAL** | SHAPING MACHINES | MILLING MACHINES | GRINDING MACHINES

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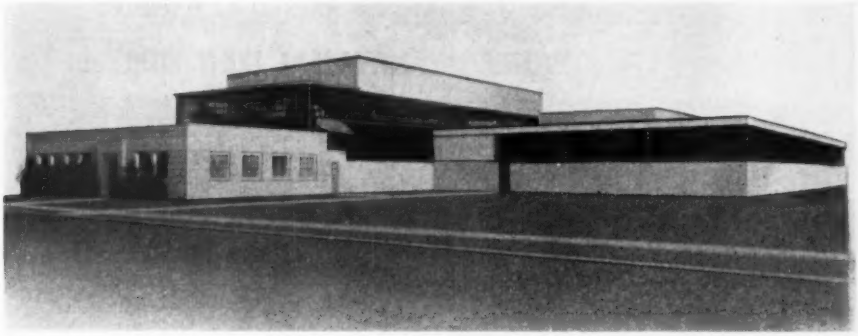
G. Blair Sheers, president of the Standard Horse Nail Corp. (manufacturer of "Stanho" steel products and "Koolhead" foundry chill nails), New Brighton, Pa., announces the appointment of **Joseph D. Brubaker** as treasurer and member of the board of directors to fill the vacancy caused by the death of **A. L. Bingham.**

David Shipley has been appointed general sales manager of Marvic, Inc., San Mateo, Calif., manufacturers of the Lathemaster 4-faced tool block and instant change tool holders. He was formerly regional sales manager for one of the West's large machinery manufacturers.

H. B. Van Auken

David Shipley

Peerless opens modern special-machinery plant



Pennsylvania Peerless Corp., Pottsville, Pa., recently announced the official opening of its modern special-machinery plant. Facilities include four entirely new buildings—the precision machining plant, general machining area, assembly plant and the executive offices. All are of cinder block and glass construction, insulated. Floor space totals 25,000 sq. ft.

Equipment manufactured by the firm includes all types of boring, drilling, tapping, chamfering, reaming and milling machines.

90 FS AUTOMATIC UNIVERSAL

FLUTE GRINDER

← GRINDS TOOLS LIKE THIS FROM SOLID!

Grinds straight or spiral flutes from solid. The 90 FS can produce a variety of drills, reamers, end mills on a production basis. Indexes automatically. Write for price and description.

Also Manufacturer of Automatic Miller for Spiral Fluting.

WARDWELL MANUFACTURING CO.

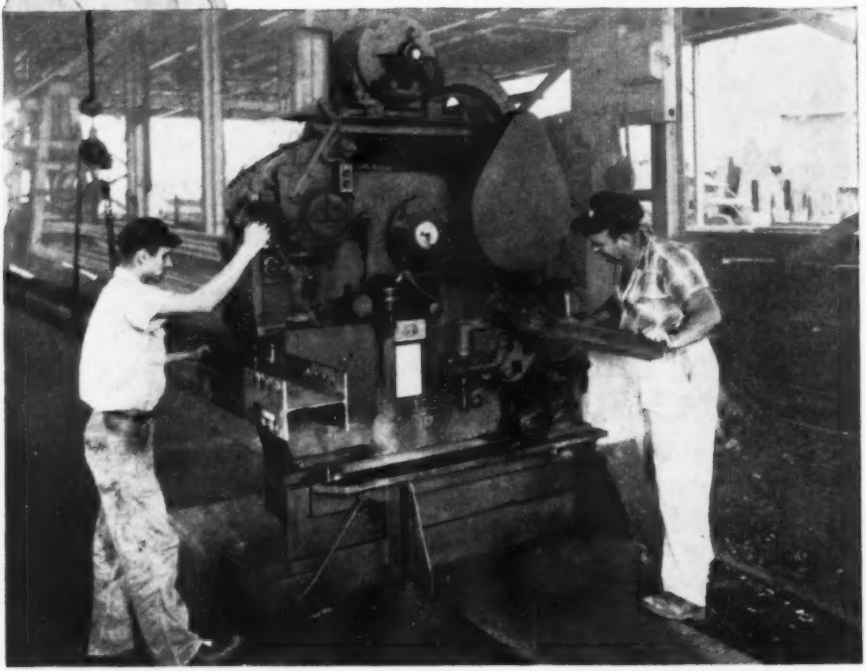
3807 Ridge Road, Cleveland 9, Ohio

"So popular with our shop men it's overworked to the neglect of our several other punch and shear machines. In fact, so much that I have ordered another."

Writes L. A. Delisle, Shop Superintendent
Bushnell Steel Works, Inc., Tampa, Florida

—about his

"BUFFALO" UNIVERSAL IRON WORKER



ONE MACHINE DOES UP TO 5 FABRICATION JOBS

What Mr. Delisle's men like about the U. I. W. is that you can do a whole shop-full of fabrication jobs on a work piece without travelling from machine to machine. You can do a wide variety of punching—such as the Bushnell man above is doing on the I-beam web and flange—while another man can be mitering angles or tees 90° or 45°, cutting round or square bars, cutting flats, slitting or notching at the same time. Small wonder so many users of "Buffalo" Universal Iron Workers call them the "most useful machines in the shop". Why not write for Bulletin 360-E and look into these durable, multi-purpose machines that will save space, dollars and hours in your shop?

"Buffalo"

BUFFALO FORGE COMPANY
161 Mortimer Street Buffalo, New York
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
DRILLING PUNCHING SHEARING CUTTING BENDING

WHY YOU GET

Precision Flatness, Finish and Parallelity in Production Quantities . . .

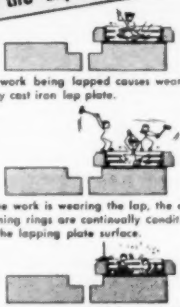
WITH A LAPMASTER

Here is the machine to do the job if you want precision flatness in production quantities at an economical rate. Lapmaster machines readily lap to the extreme close tolerance of one light band (.0000116") or less. In addition, they produce an extremely fine finish to as low as 1 RMS.

Check these features and investigate the possibilities for the Lapmaster in your plant.

1. Operator requires no previous lapping experience.
2. Automatic timer provides controlled lapping cycle for production efficiency and allows time for pre-loading work-holders.
3. Simplicity of design allows ease of loading and unloading.
4. Loose abrasive distributed evenly over lapping area insures uniform results.
5. Serrated lap plate collects and disposes of spent compound and removed stock.
6. Precision laps identical parts or parts of various shapes, heights and materials in one cycle.
7. Self-conditioning lap plate eliminates down time for truing or replacement.

How the Lapmaster Works



The work being lapped causes wear on heavy cast iron lap plate.

As the work is wearing the lap, the conditioning rings are continually conditioning the lapping plate surface.

Since the wear action of the conditioning rings is greater than the wear caused by the work being lapped, the flatness of the lap plate is automatically maintained.

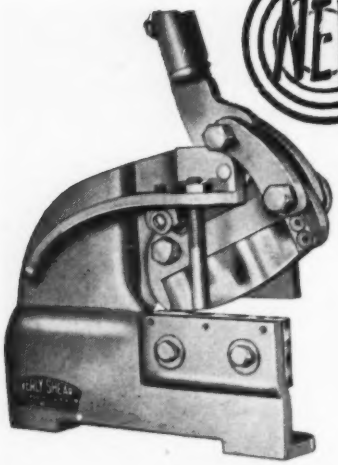
FREE DATA

Learn more about the possibilities of production lapping and the interesting subject of measuring flatness. The illustrated fact-filled booklets are yours for the asking. Write today.

JOHN CRANE

Crane Packing Company, Dept. BB-11, 1812 Cuyler Ave., Chicago 14, Ill.

CRANE PACKING COMPANY



NEW *Beverly*

SLITTING SHEAR

MORE POWER . . . Easier Cutting
EXCLUSIVE DESIGN . . . Cleaner Cuts
RUGGEDLY BUILT . . . Last a Lifetime
CAPACITIES TO 3/16"

Get faster, easier slitting and trimming with a new design Beverly "SS" Series Slitting Shear. Rigid, strongly braced frame; compounded linkage and extra strength where needed. Many exclusive features. Write for FREE illustrated Bulletin.

See your Beverly Distributor today.
Ask for a demonstration—no obligation.

SS-3⅛" slitting cap; ¼" trimming; 5/16" x 2" bar capacity.

Beverly **SHEAR MFG. CO.**

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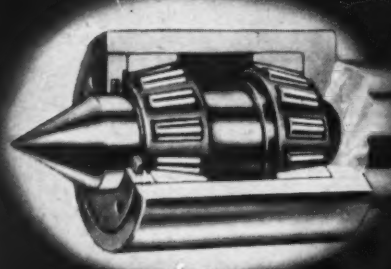
. . . heavy loads at high speeds

Falls **ROTO CENTER**



Accurate, low cost turning on tough continuous-run work. Preloaded, matched roller bearings assure rigid set-up. Precision ground shank. Heavy-duty grease seal. Many exclusive features.

for
lathe and grinder
tail stocks

PRODUCTS Falls INCORPORATED

FALLS PRODUCTS, INC., 122 Genoa Street, GENOA, ILL., U.S.A.

SawMore
METAL CUTTING MACHINES

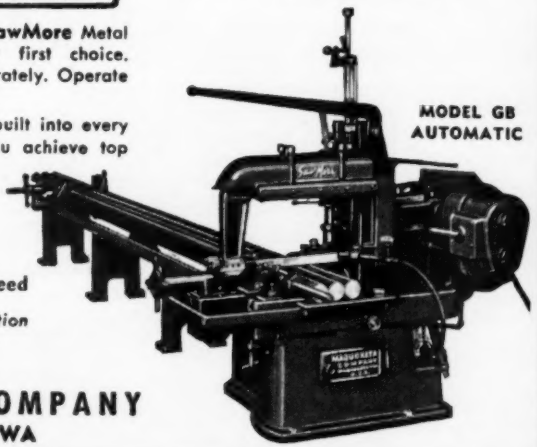
FAST METAL CUTTING ... MADE EASY!

If it's speed you need . . . **SawMore** Metal Cutting Machines are your first choice. **SawMore** Machines cut accurately. Operate at lowest cost.

These highlight features—built into every **SawMore** Machine—help you achieve top production.

- **Self-aligning blades**
- **Automatic feed**
- **Gears—constant mesh**
- **Positive compensating feed**

Write for complete information on the advantages of SawMore Machines



MODEL GB AUTOMATIC

MAQUOKETA COMPANY
CLINTON, IOWA

Tighten the Reins—Stop Loose Buying

Use **NUPLA hammers**
The one soft-faced line serving all industry
with interchangeable NUPLAFLEX tips

MIGHTY—but gentle

SIMPLIFY—SAVE INVENTORY NUPLA hammers with their complete size and weight selection do the **whole** job . . . easily interchangeable NUPLAFLEX TIPS in 5 hardnesses meet all soft-faced pounding requirements . . . replace rubber, rawhide, lead, plastic and all other lines of soft-faced hammers.

HAVE TREMENDOUS ECONOMY APPEAL Super-durable NUPLA hammers have **proved** to outwear ordinary hammers 10-50 to 1 . . . and have played important roles in many cost reduction programs. Write for actual case histories.

THE CHOICE OF INDUSTRY Many users **specify** NUPLA with NUPLAFLEX TIPS, including General Motors, Chrysler, Allis-Chalmers, Ford, Lockheed, Westinghouse, the Army, Navy and Air Force.

WORKERS PREFER THEM NUPLA hammers provide solid blows without sting . . . reduce fatigue. Also safety tools . . . non-chipping, no flying particles, sparkproof.

New Plastic Corporation,
1026 North Sycamore, Dept. No. 100, Los Angeles 38, California

Please tell me how to increase the efficiency and reduce the costs of my pounding operations with NUPLA hammers.

Name_____

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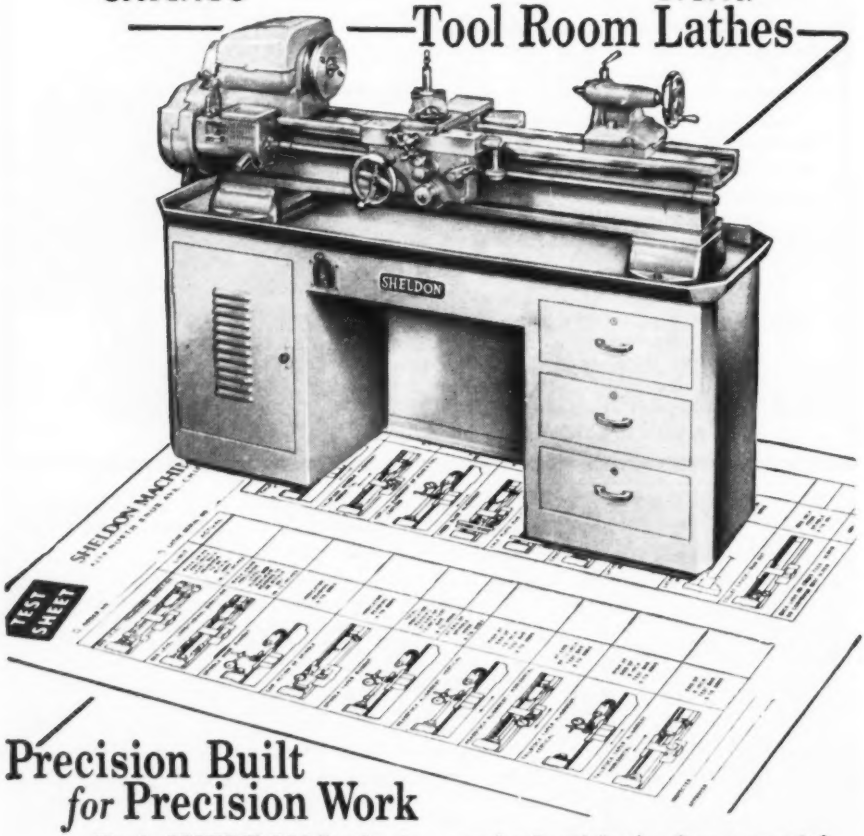
SHELDON

CHICAGO U. S. A.

Tool Room Lathes



Precision Built *for* Precision Work

Each SHELDON Lathe is a precision machine tool that in final inspection has passed the 19 accuracy checks on the SHELDON "Inspection Test Sheet."

Produced by modern methods with the finest special machines, these 10", 11" and 12" (swings 13") lathes are quality built on a quantity production basis. Selling at quantity production prices they are today's best lathe values.

SHELDON MACHINE CO., INC.

4242 North Knox Ave.,
Chicago 41, Illinois

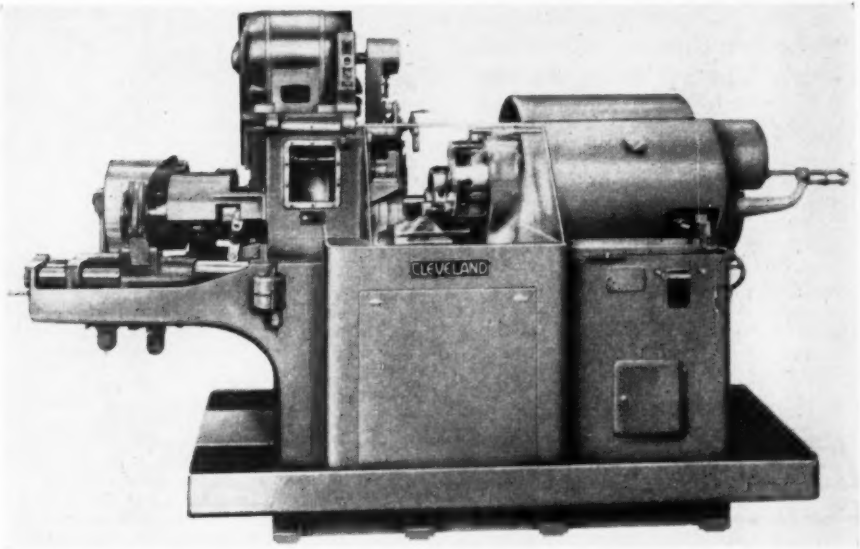
What's New IN METALWORKING

Three New Models Added to Automatic Screw Machine Line

THE CLEVELAND Automatic Machine Co., Dept. B, Cincinnati 12, Ohio, has announced the addition of three new models to its line—the 2½" Model AW (illustrated) and Models AB and AW, both 4¼" machines.
With the 2½" Model AW, such features as Geneva turret index, universal camming, quick change collets, hand crank stock feed adjustment, etc., are included.

Efficient cutting speeds for every kind of metal and for all types of cutting tools are provided by the 40 spindle speeds ranging from 69 to 1920 rpm. Four automatic speed changes are available, both forward and reverse, for each set of change gears. The alloy steel work spindle is mounted on a pair of precision Timken roller bearings using a new semi-flexible mounting which compensates for any expansion which may occur under high speed operation.

Front and rear cross slides are wide



Beauty TO LOOK AT

...BEAUTY IN

Performance

Hollow-ground and bright all over, Reltool End Mills are not only the best looking end mills you ever saw . . . they're proven in performance and cutting efficiency. In addition, they're designed for *easy chip flow* and 10% to 35% longer cutting life. Next time you need End Mills, re-tool with Reltool!

The RELTOOL Line Includes: Combined Drill and Countersinks • Cut-off Blades • Die Sinking Cutters • Dovetail Cutters • End Mills • End Mill Holders • Hollow Mills • Key Seat Cutters • Lathe Centers • Lathe Mandrels • Machine Countersinks • Metal Slitting Saws • Milling Cutters — all types • Screw Slotters • Tool Bits • Specials.

Write for Reltool's net price catalog 53.

Reltool CORPORATION
RELIABLE METAL CUTTING TOOLS

4540 W. BURNHAM ST. • MILWAUKEE 46, WIS.

A 7531-½

and rigidly supported on the machine bed for smooth, vibration-free operation under heavy forming cuts. Separate adjustable cam drums control each slide and make it possible to accurately adjust the cross slide tools relative to turret tools.

A large cylindrical tool turret is accurately fitted into a large scraped bearing and has five holes bored in a 9" tool circle in line with the work spindle. Each hole is provided with clamping bushings to hold tools securely; and smooth, rapid shock-free indexing is accomplished by the use of a Geneva indexing mechanism. Variable turret feeds are obtained through an improved, simplified mechanical drive.

Standard cams control the forward and return motion of the turret as well as that of the two cross slides and an independent cut-off attachment. Since no special cams are required to change from one job to another, change-overs can be made quickly and easily.

The length of bar stock feed can be easily set by a simple hand crank adjustment and is indicated on a scale bar. The feed tube is mounted in a cartridge and is attached to the feeding member through a latch, thus providing a quick method for changing feedshells. The master collet pads are of the Cleveland quick change type which can be changed without removing the master collet from the spindle. A motorized chip conveyor is available and can be used to remove chips through an opening under the spindle head at the stock feed end of the machine.

The essential difference between the Models AB and AW 4¼" is in the type of feed drive. The Model AB is equipped with the Cleveland design of electric feed drive which provides separate, infinitely adjustable forward and return motions of each of the five turret stations. This drive is controlled by ten dialed rheostats and a rotary timing switch with ten selector contacts. In setting up, when spindle speeds have been set and the desired rate of feed for each tool determined, the operator refers to the conveniently located feed chart, which gives him the proper dial setting for each rheostat. Then, setting the feeds becomes as simple as tuning a radio.

The Model AW 4¼" Cleveland provides variable forward and return feeds through an improved, simplified mechanical drive. An independent motor furnishes the power and drives through a thoroughly time tested friction drive unit. Changes of feed, to suit each operation, are automatically controlled by adjust-

able steel cams on the regulating wheel. Adjustable trip pins govern the length of feed for each tool and make it possible to return the turret in idle motion when return feeds are not required.

Some of the major specifications and features of the 4¼" Models AB and AW are as follows: spindle speed range 21 to 648 rpm; stock feed stroke - 14"; number of spindle speeds-56; turning length-7⅞"; tool turret diameter-14"; idle motion time-16.9 sec; 5 hole tool circle-10"; variable turret tool feeds; universal camming; high-speed Geneva turret index; rapid hand crank stock feed adjustment; geared antifriction spindle head; oil feed through turret.

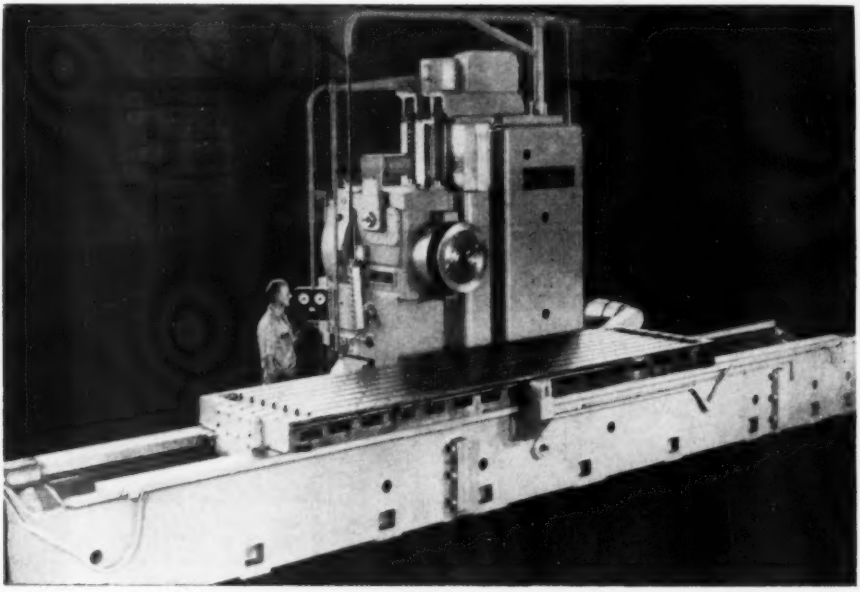
Milling die blocks from rough is type of work being done on new heavy duty Sundstrand

THE SUNDSTRAND MACHINE TOOL CO., Dept. MB, Rockford, Ill., has designed and built a new and larger Rigidmil. This machine is intended for heavy work such as milling die blocks from rough prior to cutting impression and removing the old impression before recutting on used die blocks.

This new machine, called the Model 77 Rigidmil, has vertical feed to head, in combination with longitudinal table feed so that an automatic square cycle can be obtained for rough milling of die shanks. A scale attached to the vertical head and an adjustable pointer on the bed are provided for setting up the automatic cycle or manually operating the machine.

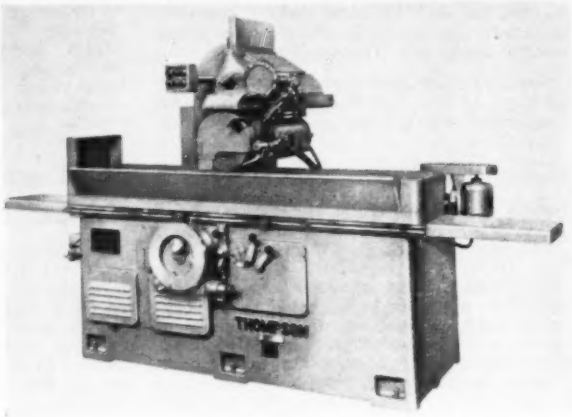
The basic standard machine has a 48" wide table and can be furnished with feed strokes of 144", 168", 192" or 216". A variable feed drive is provided for both longitudinal movement of the table and vertical movement of the head, with meters in the pendant control unit indicating the rate of feed in inches per minute.

The spindle head is of the horizontal type and has either a 60, 75 or 100 h.p. spindle drive motor. A meter on the control panel indicates the per cent of full load current on the spindle motor. Speed changes are by pick-off change gears. A variable speed drive for the spindle head can be furnished as optional equipment.



New line of hydraulic surface grinders 6" x 18" to 12" x 120"

The Thompson Grinder Co., Springfield, O., announces a new line of Type B hydraulic surface grinders ranging in sixteen sizes from 6" by 18" to 12" by 120". Thompson Type B surface grinders are said to be suitable for faster, more economical grinding of a jig plate, an intricate lamination die or jet engine part.



Features include: Cross-feeding wheel head with horizontal spindle grinding with periphery of the wheel; accurate positioning of work; with patented anti-friction elevating nut; "in position" wheel truing; simplified controls and control panels; small increments of downfeed and wider increments of cross-feed for quality finish; maximum rigidity; flame hardened cross slide ways; integral motor drive to wheel spindle; low pressure hydraulic system; automatic lubrication; built-in coolant system; tape bed way covers; adjustable bronze spindle bearing; proper weight distribution; accessibility for maintenance; manual cross-feed.

Available as auxiliary equipment are

BEFORE PRESSURE-BLASTING

AFTER PRESSURE-BLASTING

INSPECT CARBIDE FOR CRACKS . . . PREPARE FOR BRAZING . . . HONE FOR MORE WORK BETWEEN "GRINDS"

MODEL A . . . ONE OF 4 STANDARD UNITS. CUSTOM MACHINES DESIGNED TO FIT SPECIAL REQUIREMENTS.

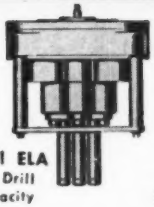
FREE . . . Learn what PRESSURE BLAST can do for you! Die and Mold Polishing, Blending Grind Lines, Deburring, Heat Treat Scale Removal, Honing of Cutting Tools, Pre-plating Cleaning . . . Hundreds of proven, money-saving applications!

Write for our new 8 page fully illustrated Booklet . . . or send samples of work you want tested to:

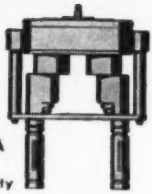
the CRO-PLATE Company, Incorporated

747-7 WINDSOR STREET
HARTFORD 5, CONN.

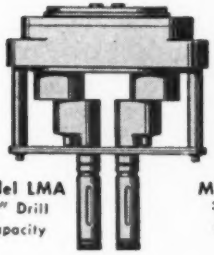
HEADS to Solve Your Drilling, Tapping, Boring Problems



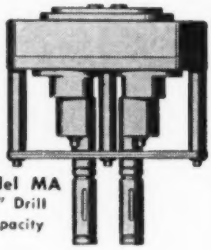
Model ELA
¼" Drill Capacity



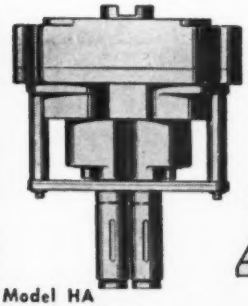
Model LA
13/32" Drill Capacity



Model LMA
⅝" Drill Capacity

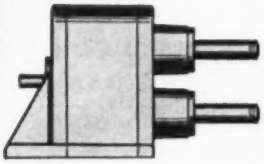


Model MA
¾" Drill Capacity



Model HA
1¼" Drill Capacity

Fixed Spindle Models
Size and Capacity as specified



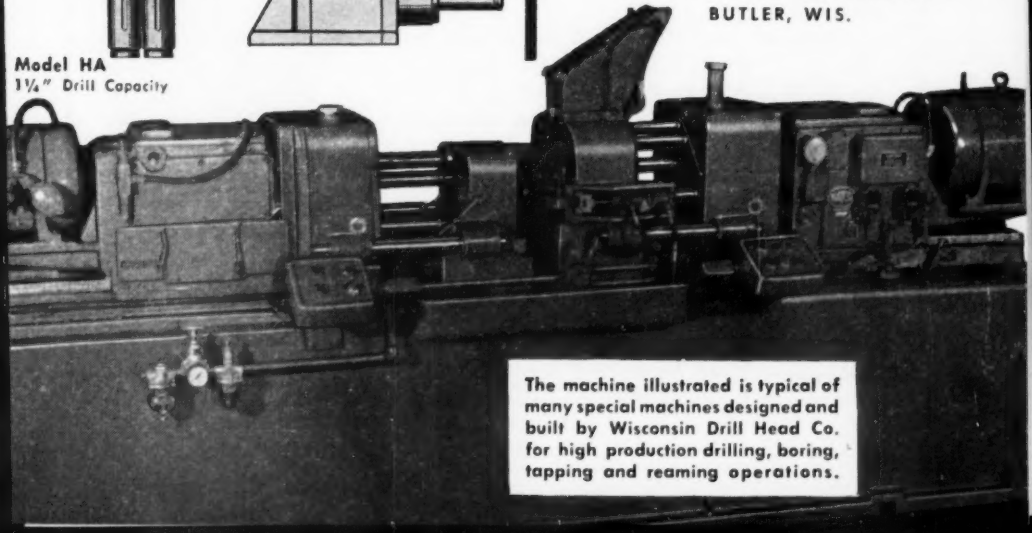
WISCONSIN *Adjustable Spindle*
Drill Heads completely gear driven... are available in 5 Standard Models, with 2 to 8 spindles and Drill Capacities from ¼" to 1¼" . . . permit adjustment to any hole pattern. Adjustable Heads with 9 or more spindles are built-to-order.

WISCONSIN *Adjustable Spindle*
Drill Heads...have Two-Piece Positioning Templates for Fast, Accurate Setups that stay put.

WISCONSIN *Fixed Spindle*
Drill Heads are built to special order in any size or capacity specified for Drilling, Tapping, Reaming and Boring.

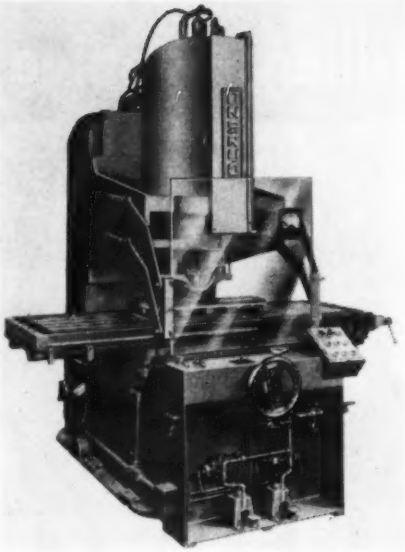
Look to Wisconsin for Drill Heads to solve Your Problems.

WISCONSIN
DRILL HEAD COMPANY
BUTLER, WIS.



The machine illustrated is typical of many special machines designed and built by Wisconsin Drill Head Co. for high production drilling, boring, tapping and reaming operations.

the following Thompson features: automatic downfeed; micrometer backup stop; coolant through the wheel; high speed spindle attachment; dust collector; auxiliary hand table feed; Hoglund magniform contour dressers; Thompson coolant filter; power elevation; magnetic chucks; demagnetizing switches and mg. sets; magnetic coolant separators; rectifiers and neutrolators; wheel balancing ways and arbors; Delpark coolant filters.



Profile milling machine for nonferrous metalworking

The new Onsrud A-42 profile milling machine, product of the Onsrud Machine Wks., Inc., 3908 Palmer St., Chicago 47, Ill., is said to offer high production capacities in the profile milling of production parts of aluminum and similar metals. Design feature is the coordinated tri-directional feed system, that makes possible the milling to profile or contour line without slow-up of feed at any point. In this system, rotary InvOmil power feed of the cutter head is automatically combined with transverse

NORTHERN

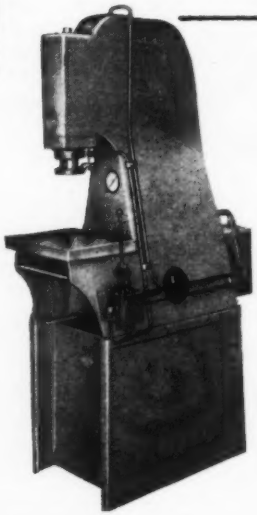
PROVEN POWER—HEAVY DUTY HYDRAULIC PRESSES AT VERY LOW COST

Tough jobs throughout industry are using these presses on production lines in a very wide capacity. As well as, various short run jobs.

Shown is the Model GD which can be had in 10 or 20 ton capacity with strokes up to 24". Models AD or Arch-type frames can be had in 10-20 or 35 tons, also with strokes up to 24".

These presses are all double acting with power both ways.

Presses shipped ready to operate, just make electrical connection.



Write for literature

NORTHERN TOOL and MACHINE CO.

1549 North 31st Avenue, Melrose Park, Illinois

View of Pines Semi-Automatic in large aluminum plant bending extruded automobile window frames. Output easily meets production line capacity.

PINES Hydraulic SEMI-AUTOMATIC BENDER

FOR PRODUCTION, SHORT-RUN AND MAINTENANCE JOBS, *YOU'LL LIKE THESE PINES FEATURES*

1 Simple Tooling — provides an efficient, economical method of handling a variety of work not adaptable to fully automatic equipment.

2 Safe, Dependable Accuracy — smooth, adjustable hydraulic power forms neat bends, assures uniform results, cuts scrap losses.

3 Easy to Set Up and Operate — simple tooling adjustments, easy toggle clamping, push-button operation, convenient hand wheel for angle-of-bend selection.

4 Saves Floor Space — compact, self-contained hydraulic unit includes motor, pump, reservoir. Occupies less floor space — 3′ x 7′.

SPECIFICATIONS

- Std. Max. Capacity — 1" O.D. 16-ga. steel tube.
- Max. Rad. of Bend — 8½" to centerline.
- Tube Lengths — up to 5 ft. std. (Provision for longer lengths if required).
- Speed — 29 rpm.
- Working Height — 35".
- Motor — 3 hp.
- Pump — 7 gpm.
- Optional — Adjustable gauges, mandrel for critical bends.

Write **For More Facts...**
Get full details on this dependable, economy-model Pines Bender designed to handle a variety of pipe, tube, bar, and extrusion bending work at speeds up to 300 bends per hour.

PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery
BENDING · DEBURRING · CHAMFERING · THREADING MACHINERY

690 WALNUT
AURORA • ILLINOIS

and longitudinal power table feed for milling along any desired profile line. Coordination of feed movements is electronically maintained. The machine operator directs feed travel by means of two hand controls.

A template is positioned in setup above the workpiece. The cutter head assembly includes a follower. The operator maintains contact between follower and template, and feeds the cutter through the milling cut. Follower and cutter are held in proper position by a pneumatic pressure device. Stroke of the pneumatic cylinder is 4". In effect the operator has a positioning range of 4" along any point of which the follower and cutter will be accurately in position in relation to the template. As a result, control accuracy is not required by the operator, and he may carry out an operation at top milling speed, it is claimed.

The vertical direct drive cutter two-speed motor is rated as 15/30 hp at 7,200/14,400 rpm. At these high speeds, any feed rate within the limits of the machine may be employed.

Table size is 27" wide and 80" or 98" long, as specified. Distance from base of chuck to table surface is 0.50" minimum to 18" maximum. Maximum travel of table in feeds is 12" for transverse power feed and 42" for longitudinal power feed with the 80" table and 60" for longitudinal power feed of the 98" table.

Improved pipe wrench

To round out their assortment of pipe tools, the Capewell Mfg. Co., Dept. B, Hartford, Conn., has just introduced a complete line of "Armstrong-Bridgeport" pipe wrenches. These wrenches are said to exceed all government specifications for Type 11 heavy duty wrenches. They

will be offered in nine sizes, ranging from six inches to 48 inches in length. An exclusive Capewell feature of the new wrench is a newly patented double-action spring which assures instant grip and release. On removal of the hook jaw, the spring stays in the handle and will not fall out, yet it is easily snapped out for cleaning or replacement if necessary.

The "MIGHTY MIDGET" Stock Straightener—2" Size

ORDER DIRECT on our 10 day money back guarantee

The *ONLY* low cost stock straightener with all these features:

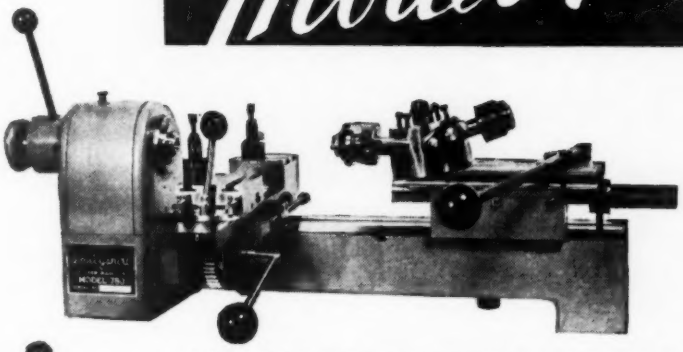
$225.00

1. Built in stock oiler.
2. Hardened and ground rollers.
3. All lower rollers gear driven, this cuts feeding pressure.
4. Front and Rear Guide Rollers.
5. All bearings either ball, needle or oil impregnated bronze.
6. Straightens steel up to 2" wide by .048 thick, brass and aluminum thicker.
7. Supplied with hand crank which can easily be removed for power feed.

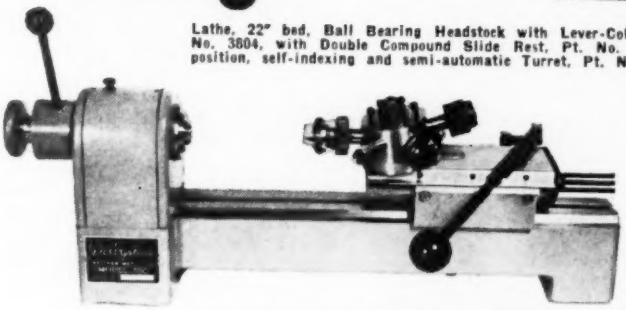
(Shown with gear-cover removed)

SPERMAN METAL SPECIALTIES 2197 E. 21 ST. BROOKLYN 29, N.Y.

DERBYSHIRE PRECISION LATHE *Model 750*



Lathe, 22" bed, Ball Bearing Headstock with Lever-Collet Closer, Pt. No. 3804, with Double Compound Slide Rest, Pt. No. 3652 and Six-position, self-indexing and semi-automatic Turret, Pt. No. 3610.



Lathe, 22" bed, Ball Bearing Headstock with Lever-Collet Closer, Pt. No. 3804, with Six-Position, self-indexing and semi-automatic Turret, Pt. No. 3160.

SPECIFICATIONS

Overall Length With Lever Chuck Closer	25"	Distance between Centers	12"
Length of Bed	22"	Center Height	2.953" (750 cm)
Height to Top of Headstock	8½"	Maximum Collet Capacity	.315"(⅜")-(No. 80 metric)
Height to Top of Lathe Bed	4"	Maximum Spindle Speed	18,000 RPM
Width of Bed	2⅞"	Concentric Running of Ball Bearing Headstock Spindle	.0002"
Width of Ways	1-13/16"		
Swing over Bed	5.905"(15 cm)	Spindle Speeds with Variable Speed Drive:	
Swing over Compound Slide Rest	2⅜"	With Pulley Ratio 1 to 1	600 to 5,000 RPM
		With Pulley Ratio 2 to 1	1200 to 10,000 RPM

DELIVERY FROM STOCK

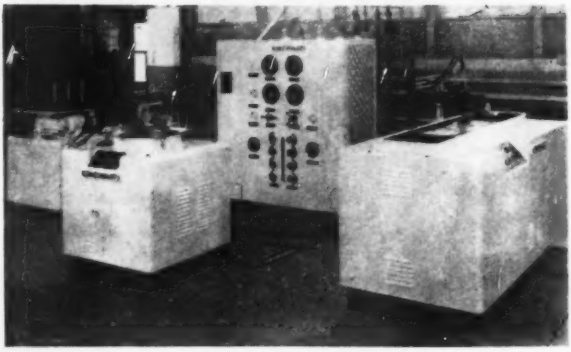
For full details write . . .

F. W. DERBYSHIRE INC.

157 HIGH STREET • WALTHAM, MASS.

Cincinnati Flamatic power control unit ends dismantling

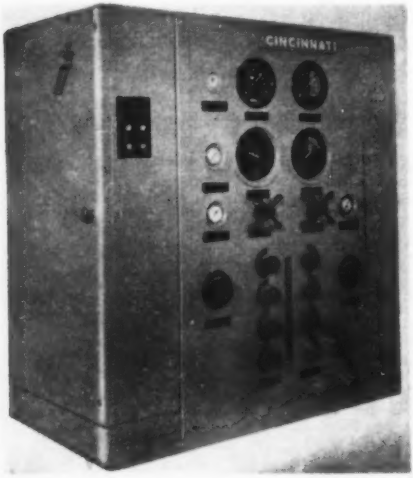
The new Flamatic power control unit—a central unit for various selective heating operations such as brazing, and spot, spin, progressive, and combination hardening—was recently announced by the Cincinnati Milling Machine Co., Flamatic Div., Dept. B, Cincinnati 9, Ohio. It is said to broaden Cincinnati Flamatic applications by permitting the user to employ a variety of simple tooling and work handling operating units. The operator can go from one job to another without dismantling the tooling, and then return and re-run a job at any time with duplication of original results.



Cincinnati Flamatic No. 2 power control unit (in center) connected with three operating units: combination hardening unit (extreme left); automatic indexing and brazing unit (left center); and progressive hardening unit (right).

The unit controls fuel gas and oxygen, pressure of water for cooling and quenching, air for actuating cylinders, and electrical power for automatic work movement and operational cycling.

Three sizes are furnished, with 2, 4, and 6 mixed gas circuits respectively. The No. 3 unit, the largest, has a maximum capacity of 4500 Btu per hour, the equivalent of 1320 kilowatts per hour. The power control units operate at top efficiency over the entire range of outputs from zero to maximum, it is claimed.



Heavy presses introduced by Cleveland Crane

The Cleveland Crane & Eng. Co., Dept. B, Wickliffe, Ohio, has announced its line of Wickliffe presses, ranging from 160 ton capacity and up. They are intended for uses such as forming, blanking, piercing, trimming, light embossing and drawing.

Frames are straight-sided and consist of four parts—crown, two side housings and bed—held together by tie rods shrunk in place. All members are box type and of all-welded steel construction. Slide adjustment is of the barrel type, said to provide extra stability, desirable on long adjustments. The entire adjusting unit is compact, self-contained and easily removed from or assembled to the slide.

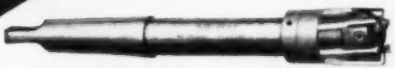
Operated by air, the clutch and brake are designed with a low-inertia principle. Worn linings are replaced without removing clutch or brake from the machine. Clutch and brake are of the rivetless type.

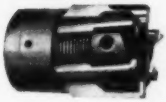
Lines of single, two and four point, single-action presses have been developed. Care has been taken to provide for

McCROSKY

1904-1954 COST CUTTING TOOLS 50TH ANNIVERSARY

Super® Adjustable REAMERS





Chucking and Shell Designs

Sizes from 15/16" to 6" in Diameter

with CARBIDE TIPPED, Cast Alloy or High Speed Steel Blades

McCrosky Super® Adjustable Reamers combine the efficiency of carbide and the greater economy and longer life of inserted blade design. Our patented pin and screw lock holds the blades as rigidly as a solid tool;— yet permits them to be released quickly; and adjusted evenly for regrinding. Consequently, only a minimum of carbide is removed, saving grinding time, and minimizing purchases of replacement blades.

McCrosky Reamers cut freely without "chatter". They avoid any tendency to "dig in";— and meet every requirement of high operating feeds and speeds. Send for Bulletin No. R-17. It gives full details.

McCROSKY *Universal* MILLING CUTTERS

Body can rotate either right or left hand. Consequently, selecting blades with tips of proper material mounted at proper angles produces a cutter that meets any requirement. Write for Bulletin 531.

McCROSKY *Wizard*® QUICK-CHANGE CHUCKS

McCrosky's Wizard Quick-Change Chuck and Collet outfits hold tools centered and rigid. They enable the operator to change tools without stopping or slowing down the spindle. Write for Bulletin 18-B today.

McCROSKY *Jack-Lock*® MILLING CUTTERS

Complete line, fitted with high speed steel, cast alloy or carbide tipped blades. Sizes from 3" to 24" to meet any requirement. Write for Bul. 17-M.

McCROSKY *Turret* TOOL POSTS

These tool posts permit tools to be swung into position quickly, indexed accurately, and locked rigidly. Four styles—11 sizes. Write for Bul. 18-T.

McCROSKY *Block Type* BORING BARS

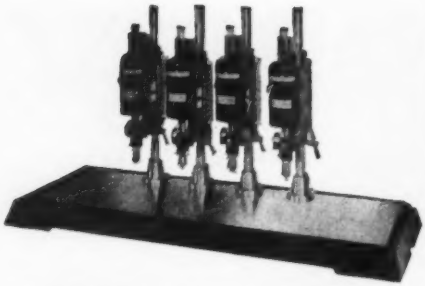
Individually ground, tapered V-key centers the block and cutting blades accurately and rigidly yet permits easy release for regrinding. Write for Bul. 18-B.

McCROSKY *Multiple Operation* TOOLS

McCrosky "Specials" combine two or more boring, facing, chamfering or reaming operations into a single tool, cutting set-up time and costs. Write for Bulletin 17-S today.

COST CUTTING TOOLS **McCROSKY TOOL CORPORATION**
MEADVILLE, PA.

Engineering and Sales Representatives in the Principal Cities



EFFORTLESS, ACCURATE SMALL HOLE DRILLING

For a decade Electro-Mechano machines have been used successfully by leading manufacturers. Proven design for small hole precision work includes:

- Super accurate chucking with choice of three types giving runout of .001", .0005" or adjustable to absolute concentricity.
- Minimum side play through use of smaller precision spindle bearings and widely spaced quill bushings.
- The exact speed for best drilling with continuously variable speed control: 150 to 4000 RPM, 1000 to 10,000 RPM or 2500 to 15,000 RPM.
- Minimum vibration—high speed units have direct motor drive, no belts.
- Special slow quill feed on dual feed models for drilling below No. 60. Air feed models with hydraulic control for high production small hole drilling.

Replace your old drilling equipment with top efficiency Electro-Mechano Precision Drilling Machines. Your drilling problems and inquiries are welcomed.

WRITE FOR LITERATURE:

THE ELECTRO-MECHANO CO.
263 EAST ERIE STREET
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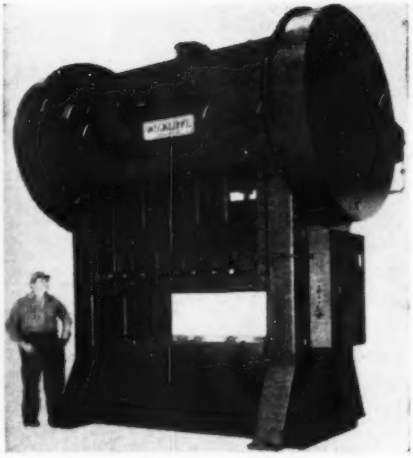


duplication of parts between the models, thus minimizing spare parts inventories for large press users.

Rubber cushioned abrasives

Three new grades of rubber cushioned abrasives have been added to the Weldon Roberts Brightboy line, until now made only in Standard, Tuff-tex and Fine-tex. Manufacturer is the Weldon Roberts Rubber Co., Dept. BB, Newark, N.J.

The new series, known as the Bright-

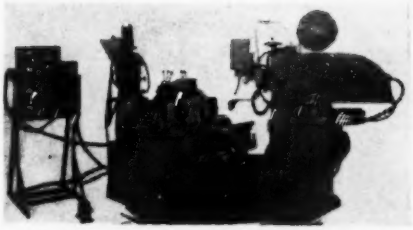
boy BL series, is available in three grades: 54BL, coarse; 70BL, medium, and 120BL, fine. All Brightboy textures are made in a variety of sizes in wheels, discs, sticks, rods, cylinders, tablets and blocks for machine and manual use. They are said to work to close tolerances and can be shaped to contour. The series features a new rubber binder, carefully compounded with abrasive grain, to achieve a tough rubber cushion for the evenly blended abrasive.

The new textures are claimed to have been successful in removing heavy tool marks from forged aluminum, smoothing weld marks, polishing and burring stainless steel.

Shell welding machine

The Morton special bearing shell welding machine, product of Morton Mfg. Co., Dept. BB, Broadway & Hoyt, Muskegon Heights, Mich., is designed to make both internal and external welds in heavy wall bearing shells. Manual air operated flux back-up is built into the clamping fixtures for internal welding.

The operating cycle of either or both head slides, with rapid traverse, variable controlled speed during welding and



rapid retraction, is automatic. Hydraulic power is used to index the table into the three positions against fixed adjustable stops. The index and welding motions are electrically interlocked to protect against improper sequencing.

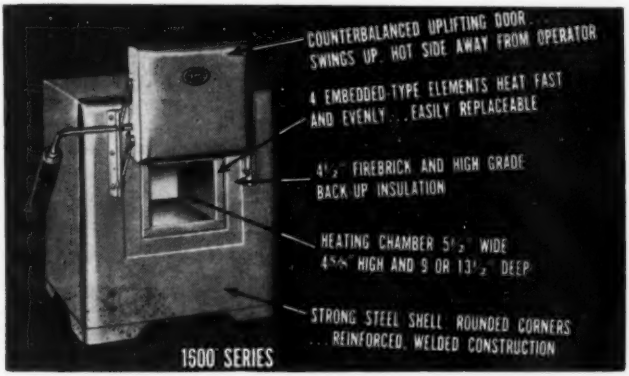
Manual air operated cast bronze clamp shoes hold the work at each of the three stations. Other features include automatic light beam gaging of the shell seam and automatic ejection of the welded bearing shell.

du Mont rectangular tool bits

The du Mont Corp., Dept. BB, Greenfield, Mass., has announced the addition of a complete standard range of super

solve heat-treat problems

with versatile Temco bench-type furnace


COUNTERBALANCED UPLIFTING DOOR SWINGS UP. HOT SIDE AWAY FROM OPERATOR
4 EMBEDDED-TYPE ELEMENTS HEAT FAST AND EVENLY...EASILY REPLACEABLE
FIREBRICK AND HIGH GRADE BACK UP INSULATION
HEATING CHAMBER WIDE HIGH AND 9 OR DEEP
STRONG STEEL SHELL ROUNDED CORNERS ...REINFORCED, WELDED CONSTRUCTION
1500 SERIES

Step up production, cut costs with Temco electric furnaces for heat treating dies, parts, tools, etc. Model illustrated above one of eight convenient sizes available with either electronic or manual temperature controls. Economical, easy to install and operate, low cost. Priced from $55.00 to $507.50. Write for literature and nearest dealer's name.

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THERMO ELECTRIC MANUFACTURING CO. • 486 HUFF ST., DUBUQUE, IOWA

KEO

CENTER DRILLS

Made of finest high speed steel. Available in all standard sizes. Always in stock for *immediate delivery*. Specials made to your specifications.

KEYSEAT CUTTERS

High speed. Right hand ½" shank. Diameter from ¼" to 1½". Standard sizes in stock for immediate delivery. Complete set —41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

CENTER REAMERS

High speed steel. Reamers from ¼" to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made for your specifications.

LATHE MANDRELS

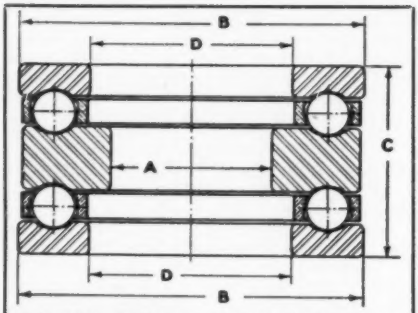
Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from 8/16" to 1" are .0005" undersize at small end, from 1⅛" to 3", 001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.



DOUBLE THRUST, GROOVED, FLAT SEATED BEARING WITH RETAINER.

Can also be furnished with self-aligning washers.

ALL TYPES OF THRUST BEARINGS

We can make them up to 25" outside diameter. We are geared to handle all of your thrust bearing needs.

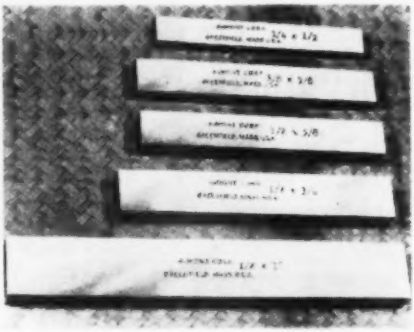
Inquiries Invited

ACORN BEARING CO.

68 Stanley St. New Britain, Conn.

high speed rectangular ground tool bits.

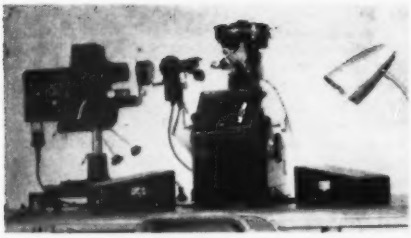
Bits are said to be made of precisely blended and balanced carbon and vanadium. They are heat treated to achieve



high Rockwell (66 to 68 C scale) and are ground to close tolerances without carburization.

Desk type research camera microscope

Wm. J. Hacker & Co., Inc., 82 Beaver St., New York 5, has announced the availability of the new desk type Reichert re-

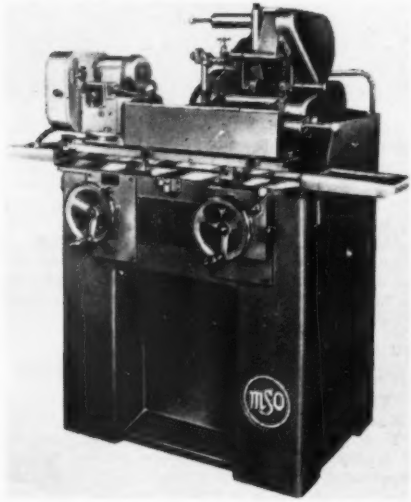


search camera microscope, MeF, which is equipped for interference as well as incident light phase contrast examinations. A micro-hardness tester is also provided. Instrument can readily be adapted to all methods of metallic examinations, it is claimed.

Microscope is equipped with monocular or binocular body tubes (interchangeable) and built-in camera with extensible bellows. Instrument and camera form one integral unit. The screen size of the camera is 4" x 5". The instrument is furnished with special microscope desk with built-in electrical components.

Small cylindrical and universal grinding machine

The new small MSO cylindrical and universal grinding machine, Model FME, for cylindrical, taper, internal, and face grinding, is being distributed by the Klingelhofer Machine Tool Co., 740-B



MODEL JA
50,000 R.P.M.
Weight 12 ounces; length 6¾ inches; chuck size ⅛ inch. Wheel guard removed for better illustration.

$42 IN U.S.A.

THEY GRIND—NOT JUST RUB!

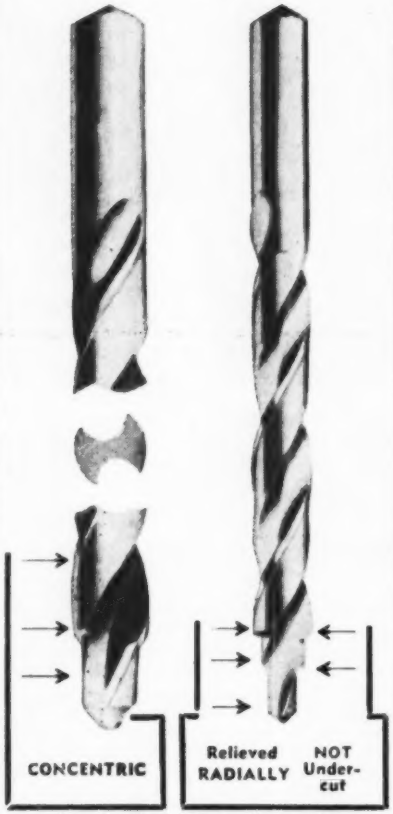
The RPM's stay up while grinding . . . not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind . . . not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work . . . longer wheel life.

MADISON-KIPP CORP.
207 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog at 3006

The
P-M
Single and Multi
STEP DRILL



For further information write

P-M COMPANY
147 GRAND ST. • NEW YORK 13, N. Y.

Colfax Ave., W., Kenilworth, N.J.

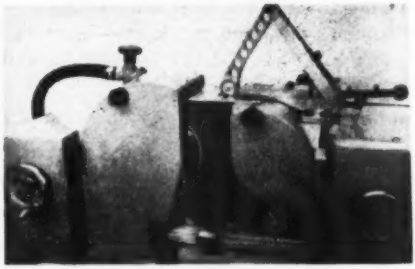
Particularly suitable for smaller types of workpieces; the swivelling internal grinding attachment constantly mounted on the wheelhead is said to enable the internal and external grinding of a workpiece in one setting. Box-section base has built-in coolant reservoir. A magnetic coolant filter can be supplied.

Other features include: wheelhead with compound swivel base, slides mounted on rollers; grinding spindle running in adjustable plain bearings, allowing a minimum of play; swivelling workhead; live or dead work spindle, mounted in adjustable plain bearings, without gears.

Centerless grinder

Eric R. Bachmann Co., Dept. B, 27-11 41st Ave., L.I.C., N.Y., has announced the availability of the Herminghausen centerless grinder, Model SR 15, adapted for production grinding of rotors and rotor shafts for small electric motors. It has a maximum grinding capacity $\frac{5}{8}$" dia.

The rotors, together with their shafts, are introduced into the grinder by means of a feed arm. The grinding wheel and



the feed wheel are split; one part of the grinding wheel grinds the cylindrical portion of the shaft, whereas the other part, dressed with a step, grinds the pointed end. The axes of grinding wheel and feed wheel are set parallel.

Machine is available for infeed or throughfeed. The dressing device for the grinding wheel is basic equipment, whereas dressing attachment of feed wheel is optional.

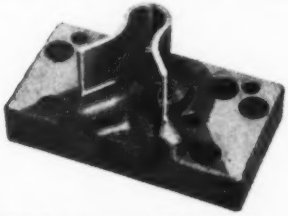
Welding machine has twin stations

The special high production capacitor can welding machine of Morton Mfg. Co., Dept. BB, Broadway and Hoyt, Muskegon Heights, Mich., is said to be a new design approach to contour welding. A twin-station setup is used to enable the one

YOU GET *SPEED* PLUS ACCURACY WITH MOORE JIG GRINDERS

HOLES from 1/64" to 8" Relocated and Ground within .0001" in One-Third Previous Time

Before hardening, this two-station die block was Moore-Jig-Bored to eliminate the need for excessive grinding. After hardening and surface grinding, all holes were Moore-Jig-Ground to exact size and location. Blank hole and center piercing hole were ground with ½° included taper. Little clearance could be allowed between punch and die. Jig grinding time: *only* 2¾ *hours.*



CONTOURS, Too, Accurately Jig Ground and Checked in One Setting

This flanged punch, impractical to grind by any other method, was a natural for the No. 2 Moore Jig Grinder. All radii—male and female—were ground accurately to location and size. The piece, having been set up on a rotary table, was aligned to permit grinding of the angular surfaces. And the entire contour was inspected by the "indicator measuring" method while the punch was still on the machine.

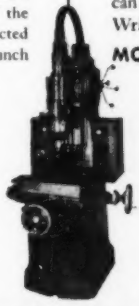
The word "versatile" must have been coined for the No. 2 Moore Jig Grinder. Not only does this machine relocate and grind straight and tapered holes with ease, but it contour grinds, chop grinds and slot grinds just as skillfully.

The Moore Jig Grinder, together with its toolroom teammate, the Moore Jig Borer, enables tool and die sections to be produced concurrently, puts diemaking on an interchangeable-parts-and-assembly basis. And it's also a time-saver on production jobs.

Employing the accurate lead screw measuring principle and a convenient system of coordinate hole location, the fast and sure Moore Jig Grinder eliminates hours of checking on bench and surface plate.

Why not find out how this remarkable machine can save *you* sizeable chunks of time and money. Write today for our detailed bulletin.

MOORE SPECIAL TOOL COMPANY, INC.
728 Union Ave., Bridgeport 7, Conn.



NO. 2 MOORE JIG GRINDER
Range 10" x 16" x 16" height. Grinding speeds from 12,000 to 60,000 rpm. Infinite feeds up and down; spindle-housing heat control. Features slot grinding attachment.

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see our catalog in MACHINE TOOL CATALOGS or write for copy

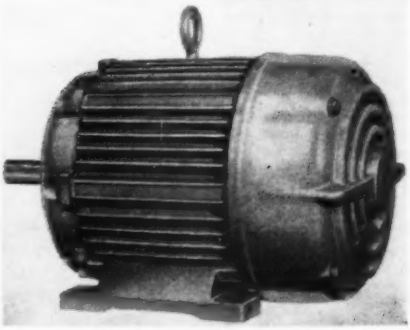
station to be welding while the other is being unloaded and loaded.

Independent speed regulation at the corners insures continuous constant velocity welding over the entire butt seam of the capacitor can. Complete automatic control of the welding cycle is incorporated, with rapid traverse of the welding torch carriage when moving from one end to the other.

Other features include the use of special fluid and electrical rotary valves to allow continuous rotation of the welding torch and power ejection of the welded part. Throughout the design high unit clamping pressure is used to insure proper contact of the material to water-cooled copper back-up bars.

New L. A. line of electric motors

The Louis Allis Co., Dept. B, Milwaukee 7, Wis., has announced its new L. A. line of electric motors in open dripproof, totally-



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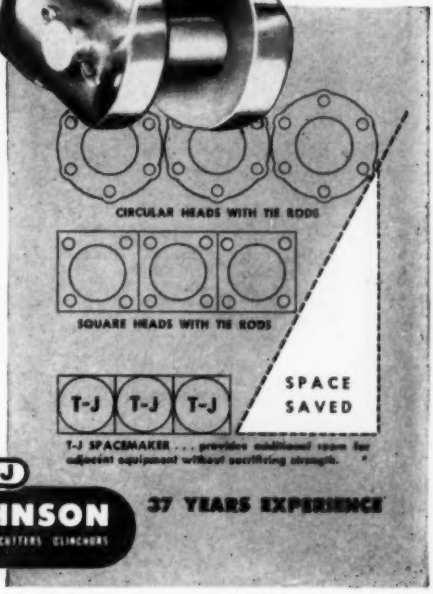
LESS SPACE!

extra high safety factor!

NEW T-J Spacemaker AIR CYLINDERS

These new T-J Cylinders *save up to 40% in mounting space*—with streamlined design that eliminates tie rods. They're *super rugged*—extra high safety factor . . . solid steel heads . . . heavy wall, precision honed, hard chrome plated, seamless steel body . . . leakproof cylinder head to body construction . . . heavy duty, hi-tensile, hard chrome plated piston rod.

Available with the new T-J Super Cushion Flexible Seals which insure positive cushion with automatic valve action for fast return stroke. Many standard sizes and styles . . . for pushing, pulling, lifting, clamping or control jobs. T-J dependability. Write for bulletin 8152. The Tomkins-Johnson Co., Jackson, Mich.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SQUARE HEADS WITH TIE RODS
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SPACE SAVED
T-J SPACEMAKER . . . provides additional room for adjacent equipment without sacrificing strength.

4 Weeks Delivery on the Spacemaker —any style, any stroke, 1" to 3" diam.

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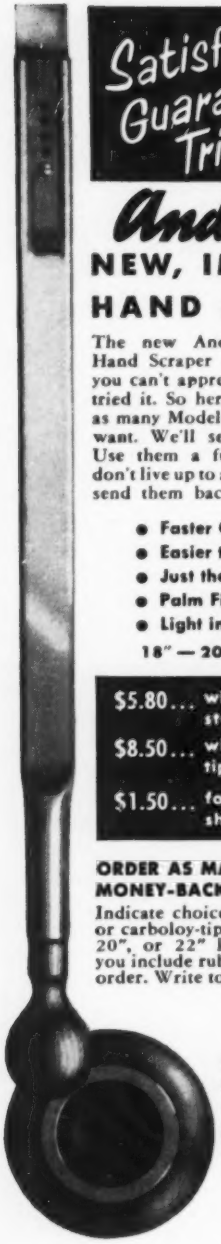

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The new Anderson Model 5-D Hand Scraper is the kind of tool you can't appreciate until you have tried it. So here's our offer: Order as many Model 5-D scrapers as you want. We'll send them promptly. Use them a full week . . . if they don't live up to all your expectations, send them back to us for refund.

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18" — 20" — 22" lengths

$5.80... with high speed steel blades

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Indicate choice of high-speed steel or carboloy-tipped blades, and 18", 20", or 22" lengths. We suggest you include rubber bumpers in your order. Write today!

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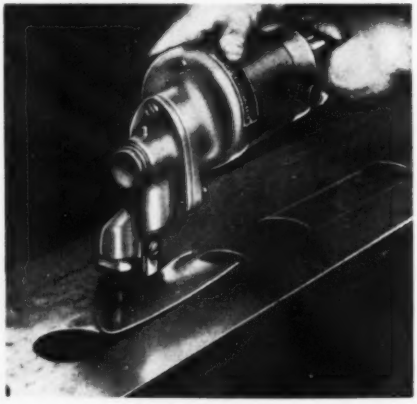
enclosed, fan-cooled and explosion-proof enclosures in ratings up to 40 hp at 3600 rpm. Motors are built in accordance with the new NEMA frame size standards. More horsepower is packed into a smaller, more functional package, the manufacturer claims.

The line features improved ventilation, greater protection, a new conduit box arrangement, new bearing construction, and more versatile mounting.

Electric hand shears

The Mercury Supply Co., Dept. BB, 410 Fairview Ave., Elmhurst, Ill., has announced its line of Flex electric sheet



metal shears, said to consume little more current than the average light bulb. Designed for good visibility to assure accurate cutting along scribed lines, shears can cut sheet metal at speeds up to 19'/ min., it is claimed.

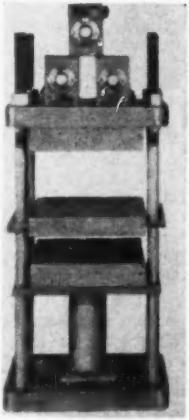
New carbide for rough turning armor plate

The Adamas Carbide Corp., Dept. B, 1000 S. Fourth St., Harrison, N.J., has developed a new premium grade, 434, for rough turning of steel and armor plate. It has also been used on centrifugally cast 309B stainless steel, with good results, it is claimed.

Feeds ranging from .015 to .068 per revolution, and speeds from 68 s.f.p.m. to 600 s.f.p.m. have been successful. The depth of cut used in these tests were from ⅛" to 1¼".

This grade should not be used for light finishing operations.

Electrically-heated platens on hydraulic presses



Four-post model hydraulic presses designed to meet specific needs of small mechanical rubber and plastic molding shops are announced by manufacturer, M & N Hydraulic Press Co., Dept. BB, 780 Route 3, Allwood, Clifton, N. J.

These multiple-opening presses are available in 10, 20 and 30 ton pressure capacities to accommodate the following size platens: 10 ton capacity—6" x 6" platen; 20 ton capacity—8" x 8" platen; 30 ton capacity—12" x 12" platen. Platens are electrically heated and thermostatically controlled up to 450° F. The presses are adaptable for operation with a hand pump or they may be powered by the shop's existing central hydraulic system. The cylinders are built for 3,000 p.s.i. operation. Presses are equipped with newly-developed M & N hydraulic packing which is said to offer little resistance on the return stroke.

New Cro-Plate wet blasting machine

The addition of a new model to its line of wet-blasting equipment has been announced by the Cro-Plate Co., Inc., Dept. B, 747 Windsor St., Hartford, Conn.

Known as the Pressure Blast Roto-Barrel, this unit was designed for the bulk, high-production rate finishing, cleaning or deburring of small parts such as screw machine products, stampings, small castings and extrusions, precision machined components, etc. The work is merely loaded into the expanded metal, plastisoled barrel and rolled into the interior of the cabinet where the blast gun, in a fixed but adjustable position, aims in the open end. A variable speed drive rated at 0-78 rpm rotates the barrel exposing the parts to the blast stream. Following the wet-blasting operation, the barrel is manually rolled out of the cabi-

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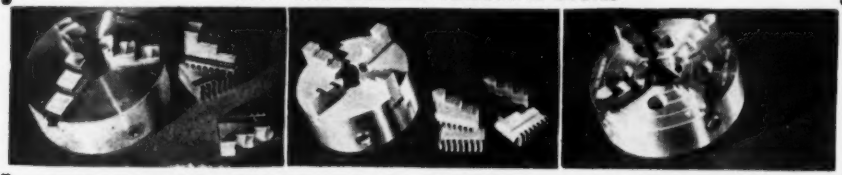
PRECISION BUILT MADE IN ENGLAND

WITH UNBREAKABLE MEEHANITE BODIES



SELF CENTERING GEARED SCROLL

Nickel Chrome Steel Pinions and Scroll, Semi-Steel Body, Universal Three Jaw, Two Sets of Jaws, Three Pinions.

Model	Size	Wt. lbs.	Price
28	2¾"	2½	$25.00
29	3¼"	3½	26.50
30	4"	6½	30.00
30A	5"	11¾	37.50
31	6"	17¼	45.00
52	7½"	29	57.50
53	9"	43	67.50
54	10½"	62	95.00
55	12"	88	125.00

Universal Four Jaw, Two Sets of Jaws, Two Pinions

Model	Size	Wt. lbs.	Price
29Y	3¼"	3¾	$30.00
30Y	4"	7	37.50
30AY	5"	12½	43.50
31Y	6"	18¼	52.50
52Y	7½"	29	85.00
53Y	9"	42	95.00
54Y	10½"	62	110.00
55Y	12"	88	150.00

Soft Jaws Available

Send for new catalog!

INDEPENDENT CHUCKS

Nickel Steel Operating Screws, Semi-Steel Body, Four Jaw Reversible, Hard Steel Jaws.

LIGHT

Model	Size	Wt. lbs.	Price
35A	3¼"	2¾	$12.50
35B	4"	4	14.00
35C	4½"	5	18.50
36	5"	7½	21.50
34	6"	10	22.50
37	8"	18¼	34.50

HEAVY

40	8"	36	$49.50
41	10"	60	58.00
42	12"	85	69.00
43	14"	104	79.00
44	16"	138	91.00

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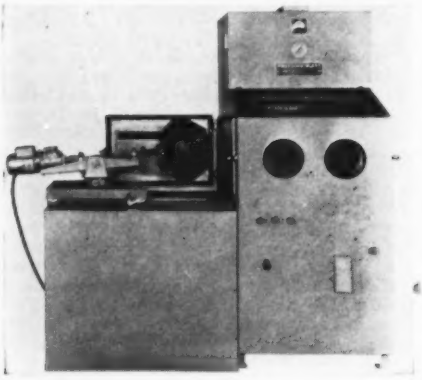
net and the work is rinsed free of abrasive slurry at the machine. This is possible since the stand supporting the dolly and barrel attachment also incorporates a rinse facility. For quick, efficient loading and unloading, the entire drive, shaft and barrel arrangement swivels easily and can be lowered or raised.

Because of its versatile design, the pressure blast roto-barrel unit may also be used as a manually operated machine. Armports and knee-actuated triggers are provided so that the operator standing outside the cabinet may manipulate and actuate the blast gun which, while fixed for the barrel operation, is easily removable.



Non-adjustable direct pressure clutch

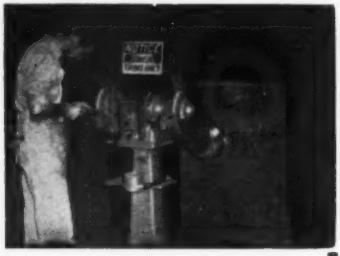
This heavy-duty, non-adjustable, Lipe direct pressure clutch has just been introduced by Lipe-Rollway Corp., Dept. B, Emerson Ave., Syracuse 1, N. Y., manufacturers and specialists in the heavy-duty clutch fields, as a complement to their Lipe ML adjustable clutch.

Design advantages claimed are rugged structure and broader interchangeability combined with high torque capacities, minimum parts, low release loads, and positive engagement to provide for extra heavy duty and to meet the demands of applications which require the non-adjustable feature.

Besides meeting the demands of installations where around-the-clock service is required, the Lipe DP clutch, which is of the dry-disc push-type construction, has been designed to minimize periodic

STOP DUST

with **DUSTKOP**



Low cost, immediate control of dust from one remote dust source, or from a whole shop!

300 cfm to 10,000 cfm per unit (22 models) standard, pre-tested, available from stock. Ask for catalog 605-2. No obligation.

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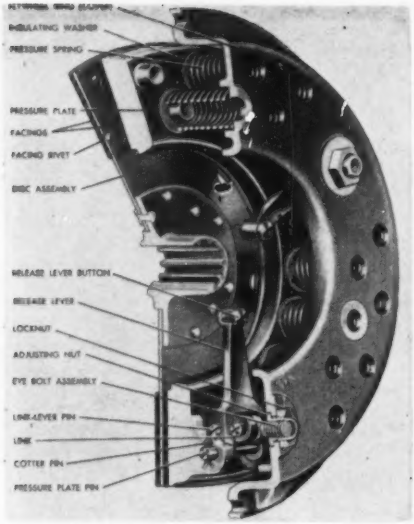


inspection, maintenance, and replacement deadlines.

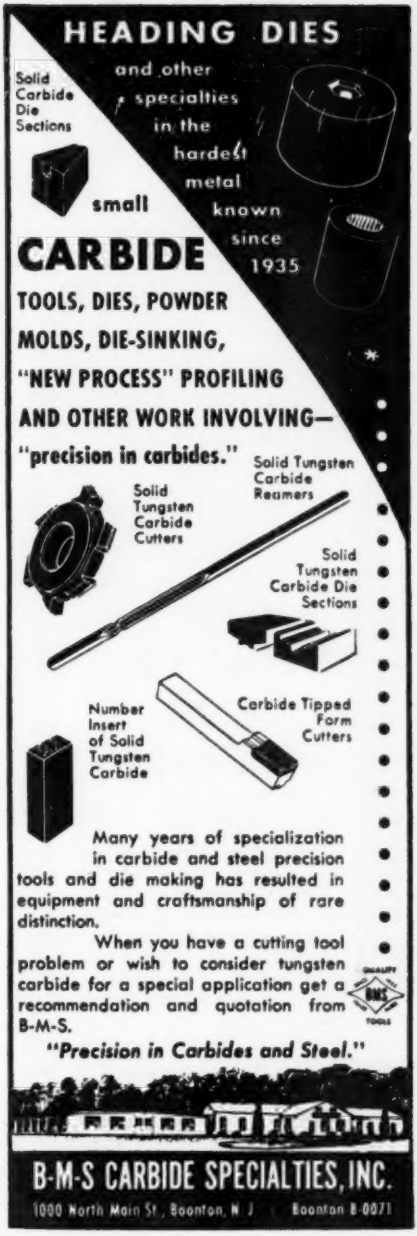
Regular automotive clutch pedal adjustments are applicable, when necessary, to maintain proper clearance between the clutch release bearing and the release levers on the new DP clutch.

By means of driving lugs in the flywheel ring and mating slots in the pressure plate, the clutch flywheel ring, which is attached to the engine flywheel, drives the pressure plate. A series of springs, arranged in three groups on the pressure plate, provides plate pressure on the driven disc assembly. The movement of the pressure plate during engagement or disengagement is controlled by a release lever located between each group of springs.

The pressure springs expand and exert pressure against the driven disc plate through the pressure plate. The construction of the pressure plate and the distribution of pressure springs transmit torque smoothly, and evenly distribute heat and wear on the friction area.

G. A. S. hot rod furnace

Using production figures based on heating a 4″ end-section of ½″ rod, the Hot Rod end heating unit of Gas Appliance Service, Inc., Dept. BB, 1211 Webster St., Chicago 14, Ill., is said to bring rod to 1900° F., in 50 seconds, with an hourly production of 900 rods. A ¾″ rod reaches the same temperature in 75 seconds with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since
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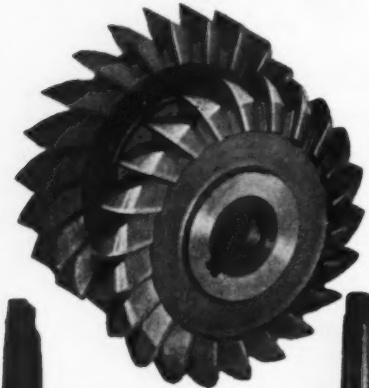

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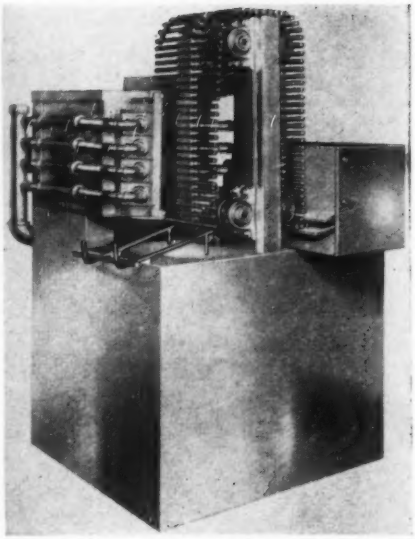


hourly production of 600 rods. Designed with conveyor and automatic hopper feed, furnace is said to handle stock sizes of rod from ¼" to 1½" diameter, with varying number of burners to satisfy the particular stock and production to be handled. Length of section heated may be up to 4", and over-all length of pieces 6" to 24".

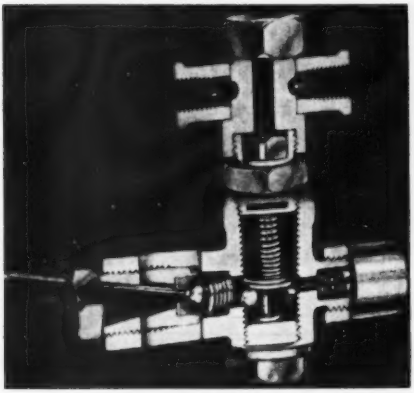
Wobble-Rod air valve permits greater freedom in pneumatic circuitry

Because of its operating principle, its all-metal construction and its flexibility of both mounting and application, a Wobble-Rod valve with integral exhaust, product of Pantex Mfg. Co., 521-BB Roosevelt Ave., Pawtucket, R.I., is said to offer new possibilities to designers and users of pneumatically operated equipment.

The lever which opens and closes the valve is a hardened rod so swivelled that the free end can move vertically, laterally, diagonally or in arcs and circles. Accordingly, the valve can be actuated—manually, mechanically or electrically—by all manner of motions, it is claimed. It reportedly allows lateral play during a vertical throw; permits direct linkage to rotating, oscillating, toggle, lever, slot, or straight thrust mechanisms; can be

adapted to cyclic operation by passing the lever-rod through an eccentric hole in a rotating disc or gear; and it is easily spring loaded to remain normally open rather than normally closed.

Its internal exhaust valve will automatically discharge an air cylinder, line or receiver when the valve closes, but can be eliminated where it is desirable to hold air line pressures after the valve has done its job, the manufacturer claims. Another integral feature is a check valve to prevent backsurge.



Constructed of noncorrosive metals, the valve is said to require no maintenance and has a long life. Bronze, brass and stainless steel are used throughout. There are no rubber or fiber seats or diaphragms. Mating parts are said to be designed to seal without gaskets or packing, and are threaded together without bolts or flanges. Dissimilar metals are used at all friction points to prevent galling and reduce operating forces. All springs are of the compression type to insure safe operation in the event of spring failure.

Versatility of installation is the result of both right and left hand outlets, ¼" ips; a double-ended inlet, ¼" ips, which can be rotated and clamped through a full 360°, and a drilled and tapped flange for panel or bracket mounting.

The valve will operate in any position. It commonly serves as a pilot valve to actuate larger controls. Its range of usefulness is up to 125 psig. Open valve diameter is ¼". Over-all dimensions are 3⅛"x5"x4⅝" high. Weight is 2¼ lb.

SPECIFY KASSON PRECISION COLLETS AND ATTACHMENTS

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3AT, 3C
1A, 4C
5C
480
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All collets in hexagon, square and round.
KLUTCH-KOLLET
Stop collet for accurate chucking to 2¼" dia. Soft head for easy boring. Lowest price on market! Models 3AT, 3C, 5C.

FOR ATLAS • LOGAN • SOUTH BEND CRAFTSMAN • SHELDON LATHES, ETC.

LEVER-TYPE DRAWBAR ½" cap.
Positive grip on undersize, oversize or standard diameter work! Patented coordinate cams eliminate fingers.
HAND DRAWBAR ½" cap.

Let us quote on your quantity orders for any type of collet, live center or other machine tool attachment!

KASSON Precision

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The precision of a machine tool plus the durability of a workhorse. Complete with ½ H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

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Cut time and cost in rivet spinning

These fast, sturdy, easily operated machines put your riveting on a production basis in terms of speed and low cost. We'll gladly demonstrate what they can do and the high quality of work they turn out. Send samples of your parts to be riveted and we'll give you time and cost estimates on handling your rivet spinning on a LINLEY.

Sizes and types for iron and cold rolled steel rivets up to ¾"; larger capacity for rivets of softer materials.

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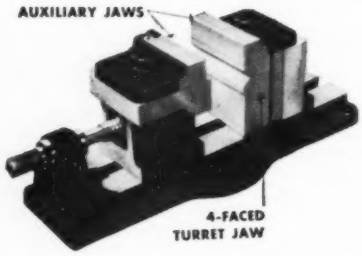


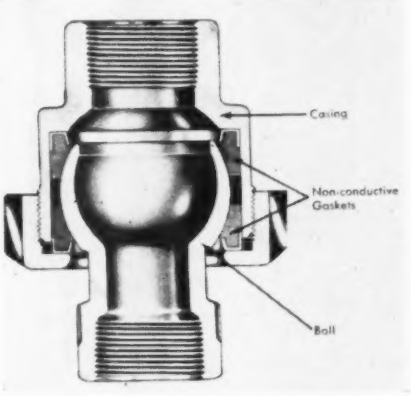
Brown Turret-Jaw Utility Vises cut production costs by eliminating time wasted on "rigging" set ups. It improves work quality because of rugged construction and ability to hold work tightly.

For complete specifications and prices write for Bulletin 23B, Brown Engineering Co., 126 N. 3rd Street, Reading, Pa.

BROWN UTILITY VISES

Insulating joints for piping to electrolytic plating tanks

Insulating joints for piping lines to electrolytic plating, cleaning, and anodizing tanks used by metalworking



industries are being manufactured by Barco Mfg. Co., Barrington, Ill.

This development provides an electrical insulating barrier in a pipe without interfering with its capacity or efficiency for conveying steam, water, chemicals, or gases. Besides promoting safety and preventing wasteful leakage of current, the joints are often useful in preventing pitting or corrosion due to electrolysis.

The Barco insulating joint consists of a simple threaded malleable iron ball end supported between two nonconductive, O-type molded gaskets housed in a threaded malleable iron casing.

Pangborn announces self-cleaning dust collector

Pangborn Corp., Dept. BB, Hagerstown, Md., announces the production of the type CG-3 self-cleaning cloth screen dust collector. This unit is said to lower operating and maintenance costs by permitting continuous automatic dust collection, constant air volume and suction, and positive reverse flow filter cleaning.

The collector uses the principle of reverse air flow for continuous cleaning of

WESPO
T-BOLTS
BOLSTER & T-SLOT TYPES
to J. I. C.
press room standards
Forged, precision machined heat treated. Tensile strength 150,000 lbs.
SIZES
BOLSTER BOLTS — dia. to 1½" Heads sq. to 3" hex. to 2⅜" T-Slot bolts, ½", ⅝", ¾" dia. lengths to 12". 1" dia. 4" to 22" long.
NUTS — hardened — threaded to close fit. WASHERS — hardened — ground both sides.
Write for bulletin-prices
WEST POINT MFG. CO.
26931 W. 7 Mile Road
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RIVETERS . .
PIONEERS and PACEMAKERS in their line
—head rivets from smallest to ¾" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles
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THE GRANT MFG. & MACHINE CO.
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Heavy Duty
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Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.
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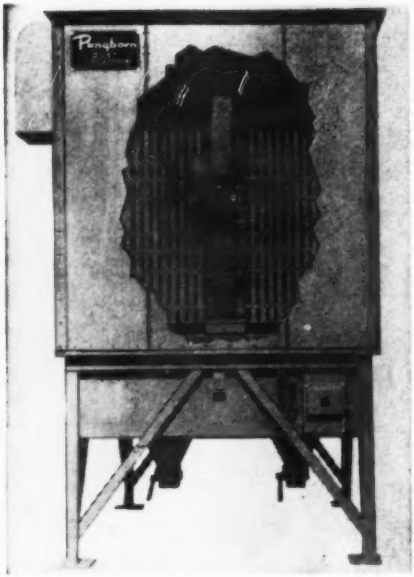

its cloth filters. This is accomplished by a traveling manifold whose integral reverse air blowers take its air directly from the clean air side of the collector.

The manifold covers three vertical rows of cloth-covered screen frames at one time. The reverse flow of air is blown through the center row of screens while normal air flow through the other rows is blocked off. The blocking action is accomplished by the flexible diaphragm on the manifold which is inflated against the grid wall under flow of pressure when the blower unit is centered on a particular row.

This arrangement causes the dust to be blown from external surfaces of the filter elements and allows it to drop into the hopper instead of being re-entrained; it also prevents air short circuiting. The blower motor in the traveling manifold is interlocked with the main exhauster motor to insure simultaneous operation.

The manifold travels at slow speeds in both forward and reverse directions. Standard sizes of the CH-3 collector are furnished with six-screen-high construction. Also available for small air volume problems are four and five-screen-high by five foot long screen sections.

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Saves TIME and LABOR
Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to 15½", leaving operator's hands free. Table swivels and locks in any position.
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Give You These

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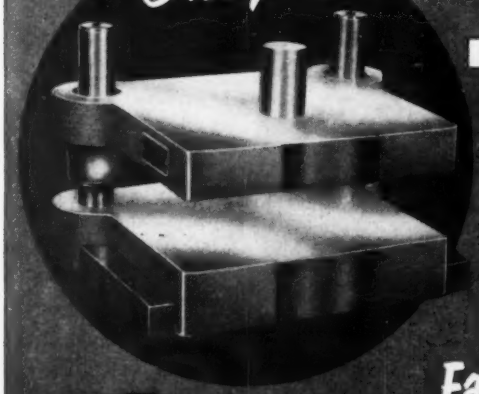

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It's no longer necessary to take needless risks in handling die sets. Risks that might easily injure the hands of skilled die makers, ruin costly dies in process or completed, or even damage press equipment. Safety features of Superior die sets have eliminated all of these dangers and have speeded up the overall handling of sets from the bench to the press. Prove to yourself the merits of these safety features in both small and large die sets.

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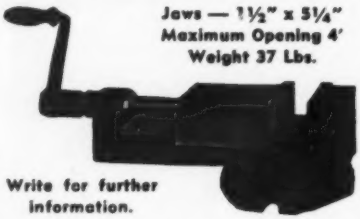
NEW BRITAIN

SWIVEL VISE



Jaws — 1½" x 5¼"
Maximum Opening 4"
Weight 37 Lbs.

Write for further information.

The body is made of semi-steel; the jaws of tool steel hardened and ground. All working surfaces are ground. The vise is as accurate as is possible and the degrees are cut to very close limits.

NEW BRITAIN TOOL & MFG. CO.
13 HARVARD STREET
NEW BRITAIN, CONN., U. S. A.

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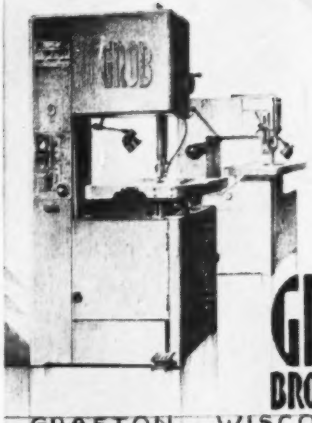

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THE Luma TOLEDO, OHIO WAY

The Luma combination etchtool and demagnetizer etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil.

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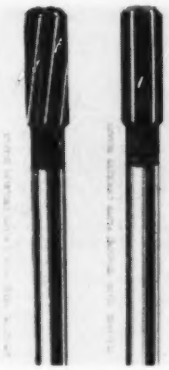
P. O. BOX 132-H TOLEDO 1, OHIO

New sizes added to reamer line

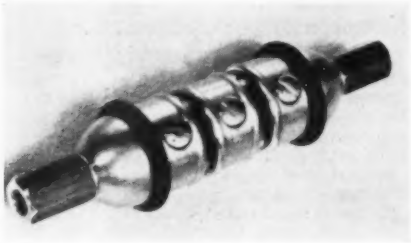


Whitman & Barnes, Dept. BB, Plymouth, Mich., has recently added new sizes to its regular line of straight shank straight flute and straight shank spiral flute chucking reamers. In the straight flute type, the following sizes will now be considered standard items:

Fractional sizes- all 64th sizes from 3/64" thru 31/64"; wire gauge sizes- No. 1 to No. 60 inclusive; letter sizes- A to Z inclusive; decimal sizes- .124" .126" .1865" .1885" .249" .251". 3115" .3135" .374" .376" .4365" .4385" .499" .501". Spiral flute type—all 64th sizes from 5/64" thru 31/64".

Pneumatic line oiler and filter

For automatically lubricating pneumatic tools with "oiled air" and at the same time filtering the line, a new oiler



is being marketed by the Air-Speed Tool Co., Dept. BB, 1502 W. Slauson Ave., Los Angeles 47, Calif. The Airspeed Williams pneumatic lubricator features light weight (12 ounces) Neoprene shock-absorber O-ring mountings and a non-breakable window which shows when oil supply needs replenishing. Any good oil up to SAE

NOW VICTOR "MOLYFLEX" HIGH SPEED STEEL BLADES for power sawing

Here's the newest Victor Power Blade —a blade that is break-resistant for safety and economy. A blade that offers moly high speed performance at no premium cost.

Victor heat treating know how producing graduated hardness.

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10" to 48" are more buy for less money!

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2. Longer Slide
3. Heavier Base
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A Rugged, Reliable Press for Small Work

Cuts Costs and Saves Money On Stamping, Forming, Drawing, Etc.
Overall height—17½"
Base size—8½"x8½"
Die bed—5½"x8½"
Ram face—1½"x3½"
Ram stroke—¾"
Positive ¾" ram adjustment.

Price: **$125.00** f. o. b. Clinton, Mo. (less motor)

Sturdy, single pin, non-repeat hand lever clutch. V-belt drive. weight 105 lbs.

30-DAY MONEY-BACK GUARANTEE

Full year warranty against defects. Send your order today. Price includes motor bracket, V-belt, motor pulley. Free circular.

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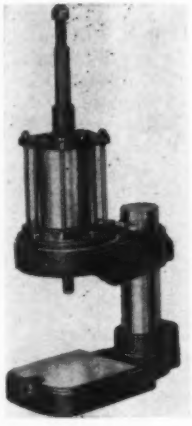
DEPT. MTB CLINTON, MO.

30 may be used. Fittings are adaptable to all standard size air lines. The device may also be used on a stationary machine line.

Versatile column press



Mead Specialties Co., Dept. CP-6, 4114 N. Knox Ave., Chicago 41, Ill., has introduced four variations of its new column press.

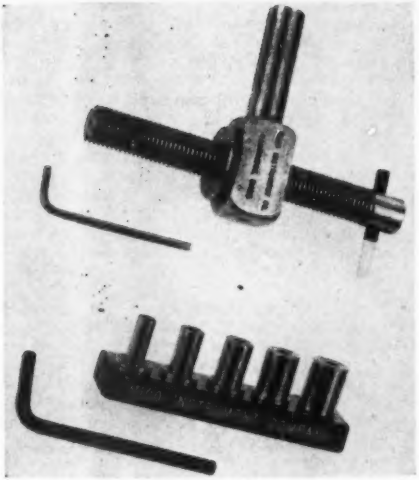
One adjustable stand takes air cylinders with 3" or 4" bore, either single-acting or double-acting. The double-acting cylinders can be furnished with any length of stroke from 0" to 36". The single-acting cylinders have maximum stroke of 4"; return stroke by internal spring. The upper ram of the double-acting presses is provided with depth stop nuts and collars to regulate the stroke exactly within the limits of the cylinder ordered. The single-acting press has no upper ram nor depth stop adjustment. Mounting bracket permits both vertical and radial adjustment.

Micrometer-type fly cutter

The latest addition to the line of Mico hole-cutting tools is known as the Mico micrometer-type fly cutter, Cat. No. 805. This precision tool is designed for power tool use with such machines as electric drills and drill presses. The fly cutter is constructed entirely of steel with a ½" diameter shank and uses a 3/16" diameter high-speed steel cutting bit. It is made by Mico Instrument Co., 78 Trowbridge St., Cambridge 38, Mass.

The unique micrometer screw adjustment provides the tool with a cutting range of 1⅛" diameter to 7½" diameter. Radius adjustments may be made by means of the graduated dial without removing the tool from the supporting chuck. All adjustments are locked securely by means of recessed socket-head set screws.

This tool will cut holes in steel, aluminum, brass, wood, hard rubber, plastics



and fiber up to thicknesses of ½" with or without a pilot. It can also be used without a pilot as a facing tool for surface milling operations. Where pilot holes are provided in the work, the tool may be equipped with a special pilot of the required diameter which is screwed into position and locked with a socket-head set screw. Pilots may be changed without removing the tool from the chuck or disturbing the setting of the cutter.

A special set of five pilots having diameters of ¼", 5/16", ⅜", 7/16" and ½" is available for use with the fly cutter.

Paddle wheel fan adopted for vapor collector

Changes in Dustkop Model VCM-2 vapor collectors as a result of requirements peculiar to the jet engine blade finishing operations performed on Pratt and Whitney airfoil blade grinders are said to have resulted in improved performance and increased capacity.

Collector is of the type normally used for collecting mist from various wet machining operations, including grinding. However, the use of an abrasive belt rather than a grinding wheel created a new set of conditions involving considerably more than simply mist to be collected.

According to announcement from Aget-Detroit Company, 205 Main, Ann Arbor,

COOLEY HEAT TREATING FURNACES

ELECTRIC BOX TYPE · FLOOR AND BENCH MODELS

For Tools and Small Parts

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THE COOLEY FLOOR MODEL

for HARDENING AND TEMPERING

Max. Temp.	Sizes	Price
2000°	12" x 8" x 18" 12" x 8" x 24" 12" x 8" x 36" 15" x 12" x 30"	$985 to $1350

All prices are less controls. Any standard controls available for automatic temperature control.

- With Cooley design, the door is virtually another wall, equally insulated with the others—entire hearth is usable.
- Natural thermal convection.
- Easily removable heating elements.

Controlling Pyrometers carried in stock — available for all applications.

Free on request: ☐ COMPLETE CATALOG ☐ "SHOP NOTES ON HEAT TREATING"

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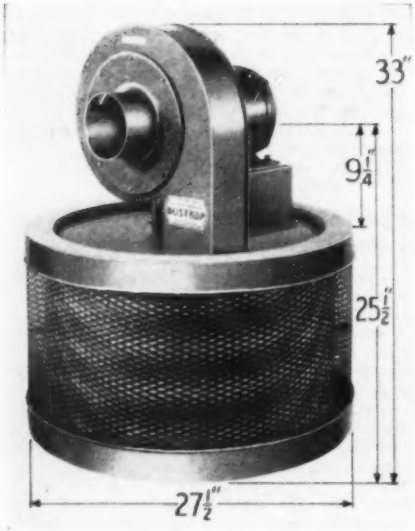
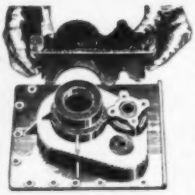


Mich., the changes, during the past year, have proved their value on installations where the collectors control the mist from the use of oil coolant on the abrasive belts used in the process. While the fine mist generated by the finishing process appears to be easily controlled by the standard collector, a by-product in the form of a heavy sludge is created by a combination of the oil, the abrasive knocked off the belting, plus the lint and stringy material from the belting itself. This presented another problem because this sludge would not only load up and block off the connecting lines to the collectors, but could load up the blades of the multiple blade fans as well.

Paddle wheel fans have been adopted as standard on all Model VCM-2 vapor collectors. This type fan resists the tendency of the sludge-like material to load up, and also provides an increase in the total cfm capacity of the collector, it is claimed. A ¾ h.p. motor continues as standard equipment. Over-all height increase amounts to 5½", which does not interfere with installations of the collectors since they are invariably installed overhead so that the collected coolant can return, by gravity, in the form of condensate to the reservoir of the machine for re-use.

AJUSTO PROFILE TEMPLATE



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Multiple Spindle Magazine Feed Power Screw Driving Machines

Latest type equipment for driving screws faster in products requiring two or more screws. These machines operate easily and require very little attention or adjustment once they are put in production.

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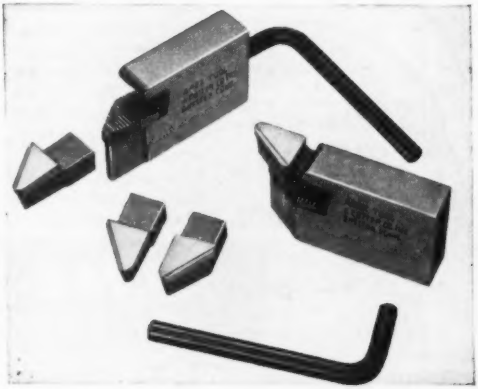

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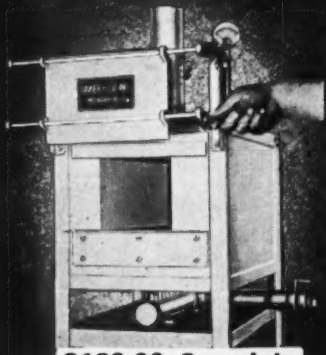

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Model No. 2 Bench Type
Maximum Temperature 2000° F
Heating Chamber 7" Wide,
12" Long, 5⅝" High.

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Atmospheric Burners.
No Noisy Blowers, No Parts To Wear Out.
1500° F In 15 Minutes and 1900° F In One Hour.
One Connection Only.
All Models Complete With Accurate Pyrometer and Thermocouple.

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When you need precision steel **DOWEL PINS**

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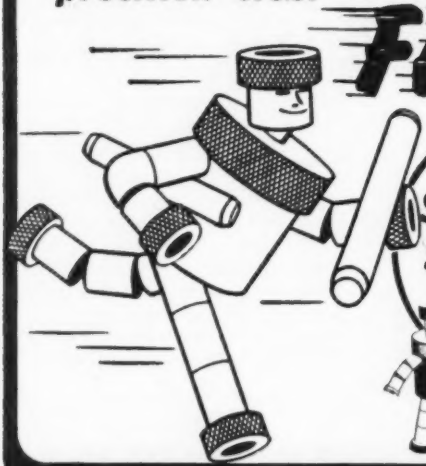

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● Order from Acme's huge stock of standard nominal and oversize Dowel Pins . . . shipment made within 24 hours. Whether you need a few, or many thousand, packaged or bulk, Acme can supply them FAST! Special sizes ground from semi-finished stock to fill any dowel pin requirement. Send for details now!

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Our machine carries the Butterfly trade mark.

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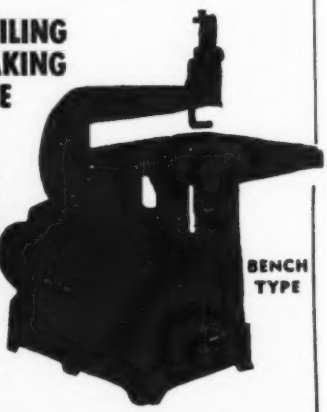
BUTTERFLY FILING AND DIE MAKING MACHINE

MOUNTED ON PEDESTAL

This is a powerful machine for heavy or small precision work in use all over the world: Airplane Factories, Ammunition Plants, Toolrooms where fast production is desired. 4 Models No. 16, No. 14, "EL" and Model "D". The larger the model, the larger the stroke and therefore more filing is performed. Furnished with or without pedestals.

Constructed as per Specification of U. S. Naval Aircraft Factories.



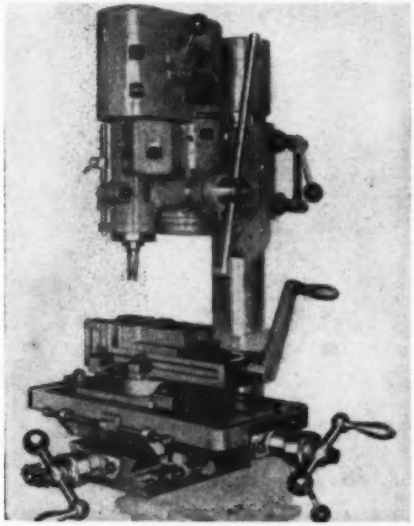
BENCH TYPE

HARVEY MFG. CORP.

Dept. H, 161 Grand St., New York Phone: CAnal 6-5170

Vertical milling machine

Masters Machinery Supply Co., Dept. MB, 3613 Archer, Chicago 9, Ill., has introduced the Arboga milling machine, which features a cross-feed graduated in increments of 0.001 inch. The Swedish-



made vertical machine is powered by a 220-volt 3-phase 60-cycle motor with a built-in gearbox which is said to be capable of providing 12 speeds on the spindle, from 240 to 4,375 r.p.m. All nuts, screws, and so on, are made to American standards. According to the manufacturer, the milling table can be removed and replaced with a round drill press table to facilitate using the machine to drill holes up to 1½ inches in diameter.

Masters is sole representative for the U. S. A. The firm is also the manufacturer of their radial drill presses up to 43".

Bryant announces boring machine, surface plates

Bryant Chucking Grinder Co., Dept. BB, Springfield, Vt., has introduced its 998 boring machine, for precision boring, precision drilling, straight or contour turning and boring, facing and grooving.

Machine can be tooled either as a single purpose machine for quantity production or for miscellaneous work in small lots. Because it is an all-mechanical machine,

GRAND offers

HIGH-QUALITY
SEMI-STEEL
SURFACE PLATES

Precision Ground or Scraped to close tolerance for layout and assembly work.
Reinforced with heavy ribs.
Three-point support.

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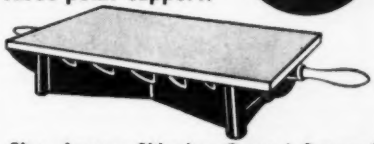
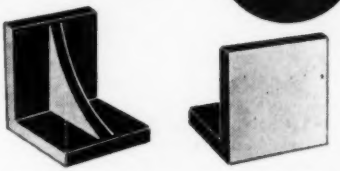


Size	Approx. Shipping Weight	Ground Finish	Scraped Finish
12x12	40	$22.50	$42.50
12x18	60	27.50	62.50
18x24	100	62.50	112.50
24x26	325	—	245.00
36x48	650	—	495.00

GRAY IRON
ANGLE PLATES
Machined ± .002" From Flat

FROM STOCK



2" x 2" x 2"	$2.70
3" x 3" x 3"	3.60
4" x 4" x 4"	4.40
5" x 5" x 5"	8.40
6" x 6" x 6"	10.90
8" x 8" x 8"	16.70
12" x 12" x 12"	45.00

DEALER INQUIRIES INVITED

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Prices subject to change without notice.

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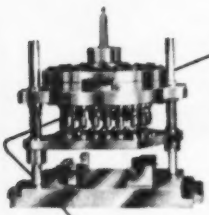
ERRINGTON

FIXED CENTER DRILLING HEADS
with JIGS and FIXTURES



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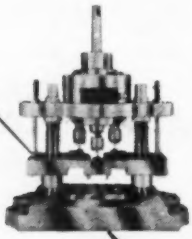

Do more . . . and do it better with Errington Fixed Center Drilling Heads. They drill any number of varied size holes on different elevations. The head has grooved thrust ball bearings at all thrust points and hardened bronze radial bearings. Heat treated spindles and gears, of one piece turned from solid bar stock. It is geared approximately 2:1. All enclosed in a sand-cast aluminum case and cover, with alemite pressure lubrication.

Send for Complete Catalog

ERRINGTON Mechanical Laboratory, Inc.
Established 1891
Main Office and Plant: **STATEN ISLAND 4, NEW YORK**

its cycle once set up is positive and constant, the manufacturer claims. Bed, bridge, heads and table of the machine are Meehanite castings. The table, which measures 17½" x 22", moves on preloaded ball slides and is mechanically actuated by a simple cam and lever unit.

The motors for driving the cams and the boring heads are mounted in an accessible recess inside the bed, thus keeping floor space to a minimum. The recess is fan ventilated.

Bryant also announces a new line of granite surface plates, for use in layout, inspection and assembly work. The stone is finished on the head of the grain by an exclusive process.

Variable speed control

A new-style variable speed control for lathes and other machines, powered by fractional and one-horsepower DC motors,

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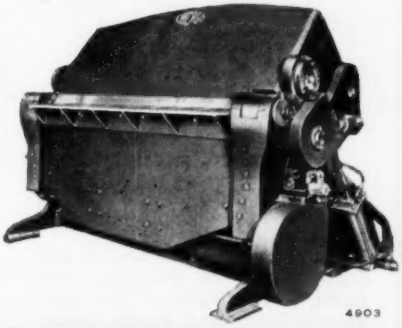

4903

DREIS & KRUMP MANUFACTURING COMPANY

CHICAGO STEEL BENDING BRAKES BOX and PAN BRAKES PRESS BRAKES

7440 S. Loomis Boulevard, Chicago 36, Illinois

is announced by Electro Products Laboratories, Inc., 4501 N. Ravenswood Ave., Chicago 40, Ill. This unique device is said to effect important time savings, particularly when several operations, requiring different speeds, are done on the same piece of work. Electro's new unit is said to accomplish what step pulley drives do, but much faster and with a resultant increase in production efficiency.

By providing a very simple means of quickly changing speeds, facing operations can be facilitated while work continues without interruption. Operations which require repeated starts and stops and reversals are speedily accomplished. Essential controls for this new variable speed motor control are located within easy reach of the machine operator for maximum efficiency as shown in the photograph of the Sheldon lathe. To change speeds, the control knob is moved easily from one setting to another without loss of time.

The manufacturer points out that the Electro variable speed motor control has large short period overload capacity, and that it will start readily under heavy load.

Toolmakers' flat

The Collins Microflat Co., Dept. BB, 2326 E. 8th St., Los Angeles 21, Calif., has introduced a new small size black granite surface plate for bench use. Size

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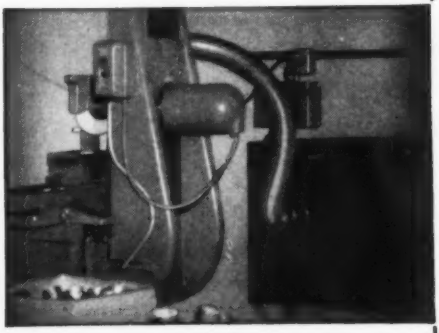
300 cfm to 10,000 cfm

for: Surface Grinders, Tool and Cutter Grinders; Polishers and Buffers; Abrasive Belts and Discs; Woodworking and Plastic Industry Equipment . . . DUSTKOPS collect almost all kinds of industrial dusts.

Ask for Catalog 605-3. Describe dust problems for recommendation by return mail — no obligation.



AGET-DETROIT CO.

502 Main St. Ann Arbor, Michigan

of the toolmakers' flat is 8" x 12" x 2" and weight, 15 lb. It is said to be finished to an accuracy of 0.0002" over-all.

Small power, kick press guard

Searjeant Metal Products, Inc., 83 Pittsford Road, Mendon, New York, announces a new small power and kick press guard. Its operating principle is based on the sweep action of an adjustable guard arm which works with the downward motion of the ram. While the press is not in operation the guard arm remains entirely out of the operator's way at the extreme left or right hand side of the press (whichever is preferred).

As soon as the pedal is pushed to operate the press the guard arm sweeps completely beyond the press feed area on half the downward stroke. Thus, operator's hands or fingers are brushed aside before the dies close.

The offset guard arm is designed so that it can sweep between the upper and lower dies driving the operator's hand or fingers from the danger point before the dies have closed.

The installation is very simple, necessitating the drilling and tapping of only one hole in the bottom of the ram while the existing top side gib adjusting screw is, in most cases, used to install the steel guard head mounting bracket.

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- **Tiltable Tables** . . . 7 degrees past the vertical and horizontal positions
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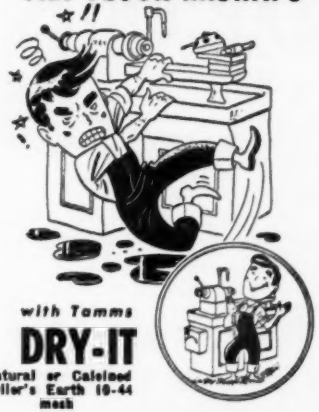

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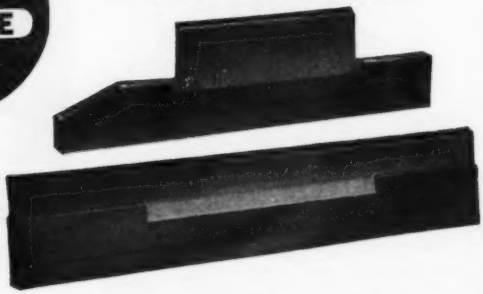
Work Support Blades
for CENTERLESS GRINDERS



Standard thrufeed and infeed work support blades available from stock. Prices on special blades quoted on receipt of prints.

SPECIAL TOOLS—Prompt quotes on receipt of prints

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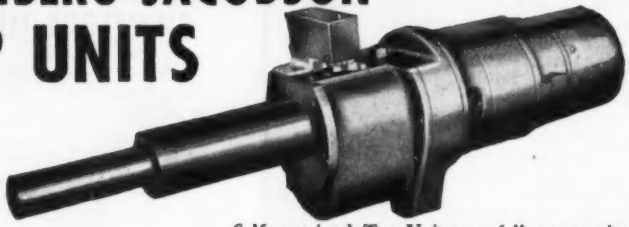
REHNBERG-JACOBSON
TAP UNITS



Self-contained Tap Units are fully-automatic with feed positively controlled by an accurate lead screw. Capacities in four sizes range from 5/16–18 and 1-1/4" stroke to 1-1/2–6 and 4" stroke.

These units are all available for quick delivery. You can mount them on structures of your own to make practical and efficient production machine tools.

Write for Literature

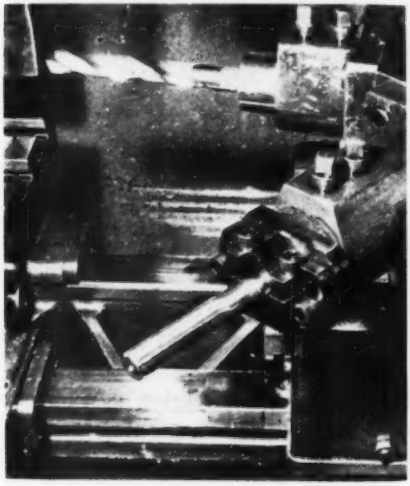
REHNBERG-JACOBSON MFG. COMPANY

DESIGNERS & BUILDERS OF SPECIAL MACHINERY — R-J — 2135 KISHWAUKEE ST. ROCKFORD, ILLINOIS

Tool holder grips without bushings

The latest addition to the tool holder line of Brookfield, Inc., Dept. BB, 172 Newbury St., Boston 16, Mass., is the KA model, available with either 1" or 1½" shank, and capable of holding any shaped tool or tool bit within the holding range of ⅛" to 1", it is claimed.

A miniature floating vise, it is only necessary to insert a tool shank in the V-jaw section of the holder and tighten the jaw screws. Dead center adjustment then can be secured by floating the



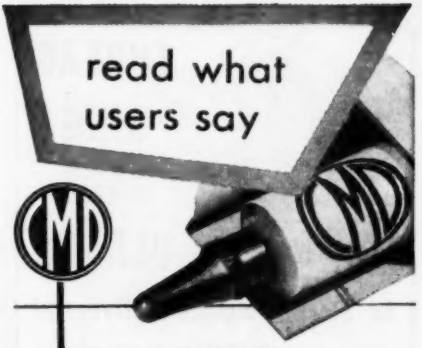
clamped tool into position and tightening the unit's body screws. No bushings are needed.

The spherical undersides of the heads of these body screws and the internally beveled washers into which the heads fit provide a balanced-pressure locking assembly which maintains uniform seating and eliminates creep or shift during tightening. The shank and V-jaw section are parallel within .0005" in 6". Run-out is less than .0001 per inch.

Tool adapter reduced to two sizes

American Cam Co., Inc., Dept. BB, Hartford 1, Conn., has announced the introduction of a new precision ground tool adapter for Brown & Sharpe automatic screw machines.

With only two adapters, in place of the conventional six, it is possible to use No. 00 tools on No. 0 machines and either No. 00 or No. 0 tools on No. 2 machines. The



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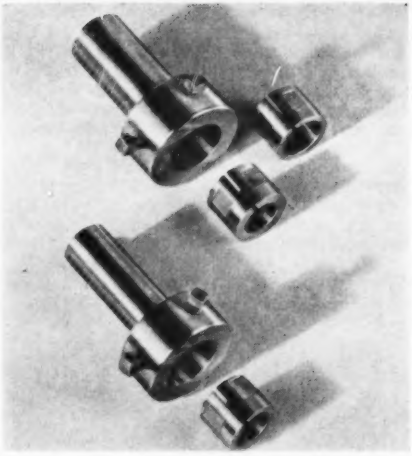


adapters are said to effect savings in tool costs by affording broader use of smaller size automatic screw machine tools.

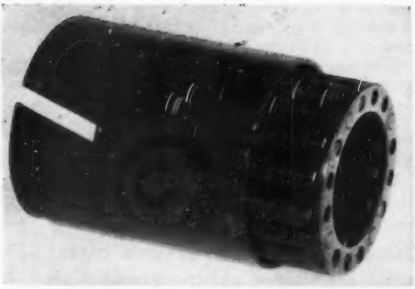
The reduction to two sizes is accomplished by means of interchangeable self-locating bushings. Both the adapters and bushings are made of alloy steel, and surfaces are hardened and ground.

Steel cage roller bearing assembly offers economies in production assembly

This steel cage solid cylindrical roller bearing, manufactured by Rollway Bearing Co., Inc., a subsidiary of Lipe-Rollway Corp., both of Syracuse, N. Y., is designed for use on a hardened and ground shaft where space is limited and the housing cannot be hardened and ground to required tolerances.

The bearing (type A, inch series) has a roller assembly and split outer sleeve; no inner race is necessary. Its roller assembly is formed by solid, hardened steel alloy rollers mounted to two hardened end rings. The split outer sleeve, made of hardened medium carbon, cold rolled steel strip and rolled into a cylinder, forms an obtuse angle joint. Because of its wide angle, rollers pass over this joint without shock or noise. Also, when this split sleeve is mounted in a housing bore, thereby bringing it into true cylindrical form, the joint closes to a proper width while sleeve resiliency remains to eliminate any tendency to creep in the bore.

The fact that the bearing's components



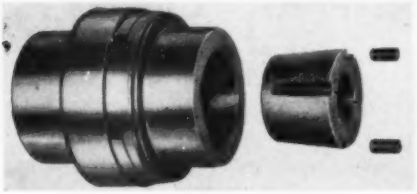
are hardened enables it to provide adequate heavy duty performance up to speeds not exceeding 1000 rpm. The hardened outer sleeve especially replaces wear on the housing.

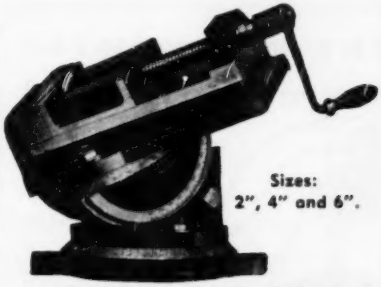
Besides allowing wide tolerance limits and easier application and removal, Rollway's roller bearing with split outer sleeve also has several other installation advantages. For example, its component parts can be assembled separately into the machine in which it is to be used. By mounting the roller assembly on the shaft at the workbench, the outer race or sleeve may be placed in the housing bore of the machine. Then, complete assembly is made economically when all parts of the machine are brought together as the roller assembly is slipped into its proper position.

Three Sizes of Type C couplings for use with taper-lock bushings

For the present, three sizes of Lovejoy Type C couplings adapted for use with Dodge taper-lock bushings are available, according to a recent announcement by Lovejoy Flexible Coupling Co., Dept. MB, 4829 W. Lake St., Chicago, Ill.

Besides permitting easy fastening to shafting with the firmness of a shrunk-on fit, couplings adapted to taper-lock bushings permit distributors to carry a smaller number of coupling bodies taper-bored for taper-lock bushings. By drawing on their own stock of Dodge taper-lock





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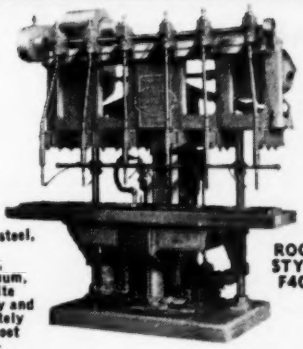

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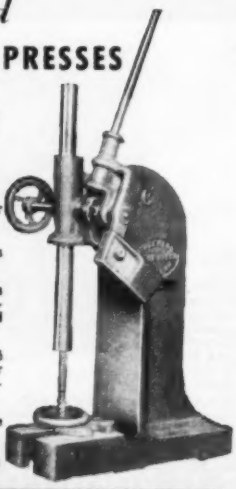

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bushings, they can give the customer immediate delivery on any size bore.

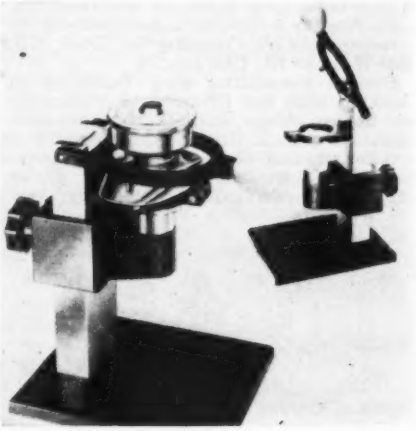
The three sizes of the Lovejoy Type C coupling which will be available for use with Dodge taper-lock bushings are: C-191 (Dodge bushing No. 2012) for bores ½" to 2"; C-226 and C-276 (Dodge bushing No. 2517) for ½" to 2½" bores.

Lovejoy also continues to stock all sizes of straight bored couplings.

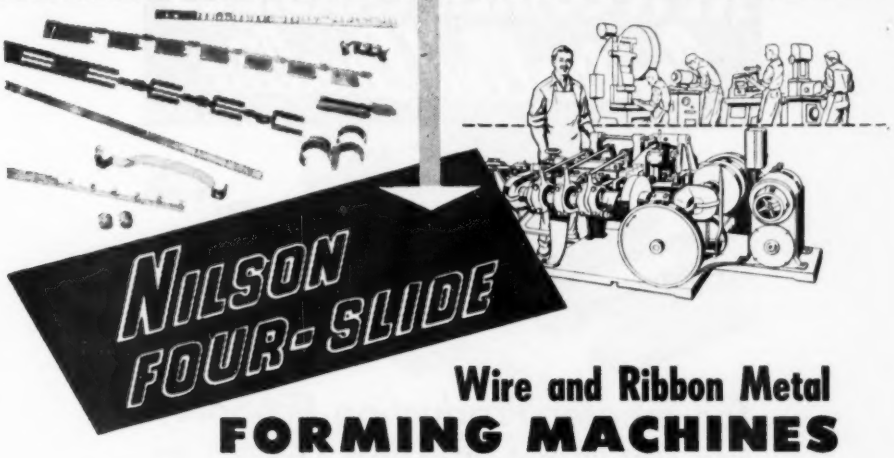
Bench adapter for portable metal hardness tester speeds production

Newage International Inc., 235 E. 42nd St., Dept. B, New York 17, N. Y., announce a new bench adapter designed to accommodate their portable metal hardness tester. It was engineered to meet the demands of mass production testing using the Newage tester to speed production line testing.

In use, the bench adapter is placed on the worktable. The Newage tester is simply placed in position and the combination is ready for work. The operator puts the part to be tested on the anvil provided. The operator lowers the operating lever. The extension arms of this lever come in contact with the tester's handgrips. By applying an even pressure on the operating lever the handgrips are depressed, lowering the tester's indentor into the metal. When the operating lever reaches its lowest point the operator can obtain a direct reading of the tested part's hardness from the tester dial. The testers are individually calibrated to Rockwell "A," "B," "C," or "15N" ranges, Brinell medium or low ranges.



Save Metal *Save Labor*



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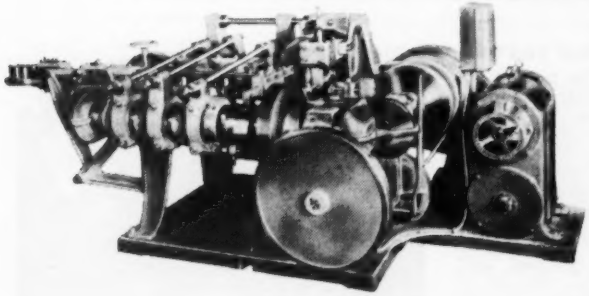

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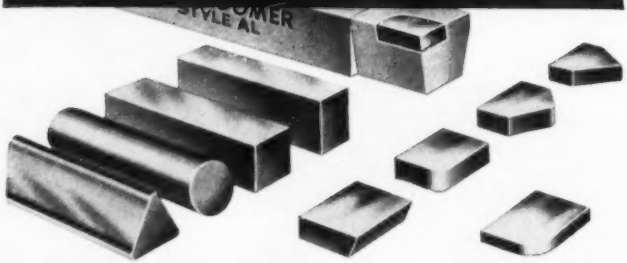

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General Sales Office: 512 Franklin Ave., Pittsburgh 21, Pa.

Face milling cutter and shell end mill

Kroslok is the name of the new milling cutters introduced by Motch & Merryweather, Dept. B, Cutting Tool Div., Penton Bldg., Cleveland 13, Ohio. Three basic members compose Kroslok: body, blade and wedge. Cross serrations on one side of the body channel mate with similar cross serrations on the blade assuring rigid holding of the blade in the body. The wedge is driven between the smooth side of the body channel and blade after the cross-serrated pattern is mated. Two basic types of bodies are of-

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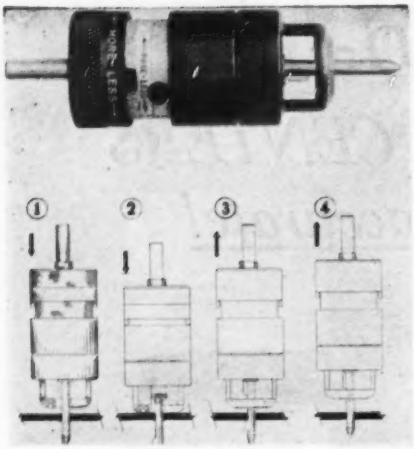
fered: general purpose and heavy duty, both for ferrous and non-ferrous applications. Weight distribution design obtains a flywheel effect for Kroslok. Heavy construction prevents body distortion. A generous chip groove keeps chips cleared from the work. Bodies are precision-machined, heat-treated alloy steel. Right-hand and left-hand bodies and blades are offered. Blades available are high speed steel, and cemented carbide-tipped. Blades are interchangeable within respective body types. Diameters: 3" through 24"; special sizes available.

Automatic deburring tool speeds sheet metal fabrication

Simultaneous deburring and chamfering of both front and back faces of holes in sheet metal, plate, extrusions, castings and forgings is now made possible by the new Noburmatic tool, the Nobur Mfg. Co., Dept. B, 717 N. Victory Blvd., Burbank, Calif., states. The simple, high-speed Noburmatic produces uniform quality deburring with consistent accuracy, the company claims, even on rugged produc-



tion line operations. In aircraft production, for example, the Noburmatic has proven effective in eliminating the dangers of cracked dimples in riveted structures.

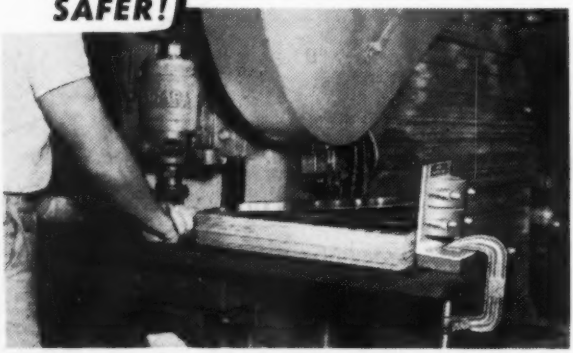
The Noburmatic is suited for use in portable drill motors, or in stationary machine tools such as drill presses and turret lathes. Its automatic action deburrs the front face of the metal during the entry of the tool in the hole. The rear side is deburred during the withdrawal cycle. Independent controls are provided for setting of working depth (or chamfer) of both front and rear cutters. On many jobs, the tool reaches back side surfaces that would otherwise be inaccessible.

Two models are offered: Model GCN, for nonferrous metals and other relatively soft materials; and Model GCF, for ferrous metals and relatively tough working materials. Standard models are available in individual tool sizes corresponding to drill gages from ⅛" diameter (.0125) to "F" (.257).

Coil stock feeder, rotary table and accessory power feed introduced

The Koil-Kradle, a new device for automatically feeding coiled stock to production machines, is announced by Benchmaster Mfg. Co., Dept. BB, 1835 W. Rosecrans Ave., Gardena, Calif. It features an automatic trip bar which actuates

FASTER! SURER! SAFER! *SEPARATIONS OF SHEET STEEL AND LAMINATIONS.*



G. S. BLODGETT CO., Inc., Burlington Vt., manufacturers of baking and roasting ovens say ". . . . many of our steel parts in fabrication are being handled more economically and with greater ease. We consider our BASCOS a good investment."

SHIPPED ON APPROVAL

. . . if not completely satisfied, return to us — NO EXPLANATION NECESSARY.

Send for the New Basco Catalog *Distributor Inquiries Invited.*

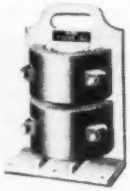
BASCO SEPARATORS

BASCO SEPARATORS reduce cost of handling, increase production, lessen injuries, save gloves, stop double feeding, lift polished or painted parts without scratching. **SEPARATES GREASY, ROUND, SQUARE NESTED OR ODD SHAPES**

Permanence of Magnetism Guaranteed

FIVE STANDARD MODELS

to simplify handling of sheet steel up to ¼" plate, stock width to 48", stock heights to 10½"



Basco

Manufacturing Co.
13 Woodside St.
Stamford, Conn.

FRAY-TREE UNIVERSAL VERTICAL MILLING MACHINE

TURRET TYPE WITH TRAVELING RAM

COMPOUND ANGULAR SPINDLE SETTING

TRULY A PRECISION MACHINE TOOL

- BUILT BY TOOL MAKERS IN THE U. S. A.
- POWER FEED SPINDLE
- TABLE SIZE 9"x36" LONGITUDINAL RANGE 38"
- SENSITIVE AS WELL AS RUGGED
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People work better when they SEE BETTER

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SPEEDS PRODUCTION

Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and *prevents squinting*—thereby speeding production, increasing accuracy, and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hand of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. $10.50.

Send for descriptive folder

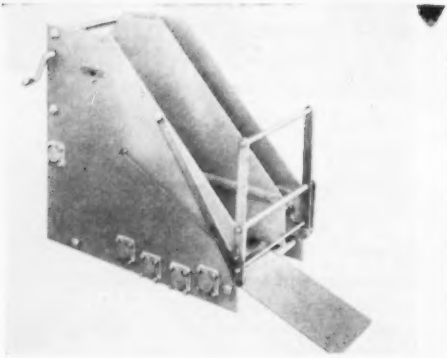
At SKF Industries, Inc.

Magni-Focuser helps in conversion of wire into "points" for ballpoint pens.

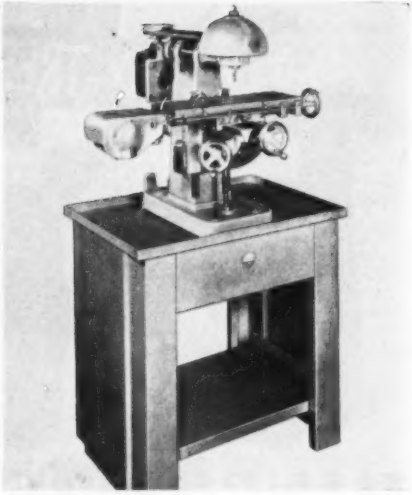
MAGNI-FOCUSER's matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

Gives true third-dimensional ("3-D") vision

EDROY PRODUCTS CO. 480 Lexington Ave., Dept. 14, New York 17, N. Y.



a motor switch as the slack loop is tightened. The motor then feeds a new loop at the rate of 90′ per minute (continuous operation), automatically shutting off when the correct loop size is reached. As a result, material is fed to the forming machine from a slack loop rather than from the full weight of the coil. Rate of feed to the forming machine is universal and is determined solely by the machine's individual requirements without attention

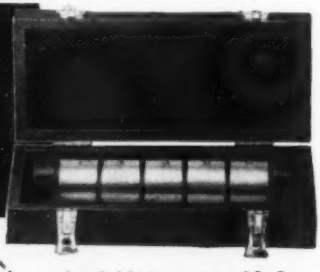


of or adjustment by an operator, it is claimed.

Also announced, is an 8″ rotary table, which has been added to the Benchmaster

Check Surface Roughness Waviness and Lay INSTANTLY

. . . Right At The Machine



With ACME'S ROUGHNESS COMPARISON SPECIMENS

Available in groups of 3, 5 and 8 specimens. Low cost.

Consists of various surface specimens, *individually finished* to definite micro-inch readings, grouped together in one handy comparison bar. Merely hold bar opposite work for fast, visual comparison check of surface roughness, waviness and lay.

ACME INDUSTRIAL COMPANY

Mfr's. of Drill Jig & Fixture Bushings

210 N. Laflin St. Chicago 7, Illinois

THE SERVICE SHOP TO INDUSTRY FOR OVER A QUARTER CENTURY

MILL IT *faster..*
SAVE LABOR!

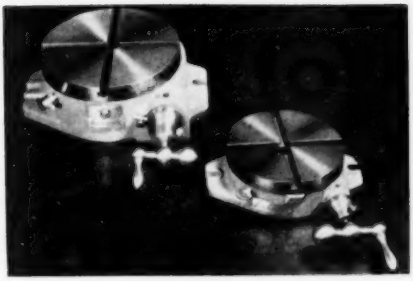
Kent-Owens advanced features mean *speed, accuracy* and *dependability*... in tool room or production milling. Rugged... simple in design and operation. Saves labor... reduces costs! Write for bulletins on wide range of hydraulic and hand-operated machines. Kent-Owens Machine Co., Toledo, Ohio.

No. 2-20 Milling Machine
Table, 42" x 12"
Table travel, 20"

KENT-OWENS
Milling Machines

6" line. The 6" and 8" models are pictured, showing size comparison. Both models feature low height in order to permit maximum use of vertical machine capacity. The 8" table measures 3⅝" high; 6" measures 2⅛" high.

The 8" table features a steel worm mounted on an eccentric which can be engaged or disengaged from the gear to permit free-wheeling, it is claimed. Twin ball thrust bearings in the quill eliminate backlash between worm and gear. Wear take-up provisions are included. An adjustable zeroing mark permits table set-



tings from any starting position. Dial graduations are 1/10°.

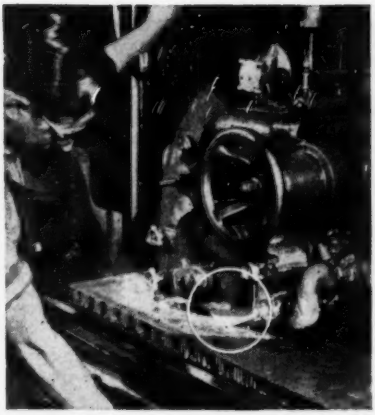
Another new Benchmaster product is an accessory power feed for use on all Benchmaster hand-screw mills. Designed to mount on the end of the table, no special machining other than drilling and tapping two holes is required.

Housed in lightweight alloy castings, a worm and gear unit is driven by a small, independent electric motor operating on 115 volt a.c. This is said to permit table operation which is independent of spindle speed. Power developed exceeds milling capacity of the machine. Four table speeds are available: 1.2, 2.1, 3.2 and 4.5 inches per minute.

Power driven coil cradle uses pinch rolls to uncoil stock

An interesting type of power driven coil cradle, the Medelton Grip-Feed Poweroll, has been announced by Wm. Halpern & Co., Inc., Dept. B, 100 Stevens Ave., Mount Vernon, N.Y. Said to mark an advancement in coil cradle design,

"The new G Bond ALUNDUM wheels give us double the production of previous wheels," reports a manufacturer grinding hardened high speed steel textile blades. He adds: *"Wheels on this job must cut very cool and free to avoid burning the very thin stock."*



Users say: For surface grinding, the new G BOND *beats them all!*

G Bond wheels in your own surface grinding will bring new speed and economy to every job — thanks to their unique grain-holding structure that produces greatly improved cutting action. Remember, the G Bond is the most modern, most efficient vitrified bond ever developed — a typical Norton "Touch of Gold" achievement that steps up grinding performance and product quality while cutting grinding costs.

See your Norton Distributor for the G Bond wheels, cylinders and segments you need. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

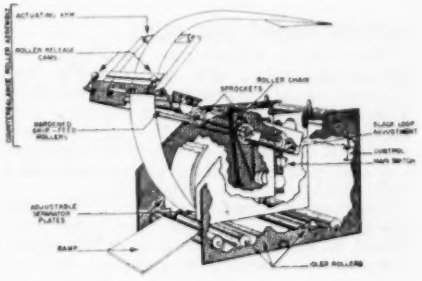
NORTON ABRASIVES

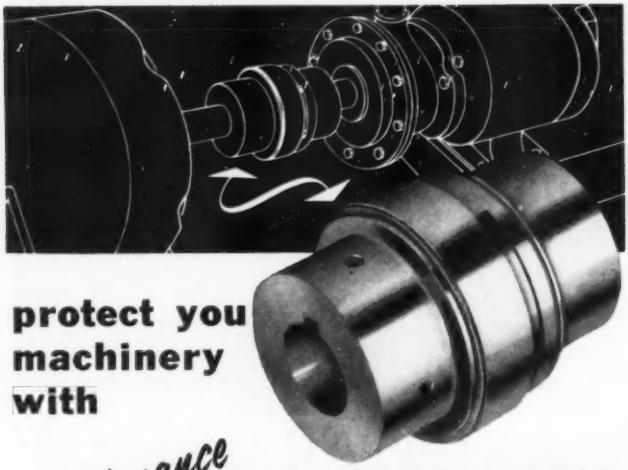
Making better products... to make other products better

W-1538

machine embodies the use of power driven pinch rolls to uncoil the stock, much the same as a roll feed on a power press. The rolls are spring loaded and thus eliminate all slippage of heavy gage stock.

Material up to ⅛" thick can be fed to the press automatically. Hard, tempered, kinked or rough coil stock does not impair efficiency, it is said. The hazards of lifting heavy metals are eliminated, since machine simply rolls them into the cradle. Coils up to 40" maximum diameter, 12" stock width, and 2400 lb. coil weight can be accommodated.





protect you machinery with

maintenance free **LOVEJOY FLEXIBLE COUPLINGS**

When you install Lovejoy Flexible Couplings you get more than just long-lasting smooth power transmission. You get maximum protection against surge, backlash and starting torque. You get reduced down-time and less maintenance, since cushions can be changed without shutdown and **Lovejoy Flexible Couplings never require lubrication.**

Accurately machined bodies and jaws and cushioning materials engineered to the load conditions are combined in a compactly designed coupling to keep your machinery running better . . . longer.

Types and sizes for all applications

Send for complete catalog . . . . . Yours without obligation.
Also Mfrs. of Lovejoy Variable Speed Pulleys and Universal Joints

LOVEJOY FLEXIBLE COUPLING CO.

4829 West Lake St. Chicago 44, Ill.

Carbide tipped gun drills

The carbide tipped gun drill made by Chicago-Latrobe, 411 W. Ontario St., Chicago 10, Ill., is recommended for deep hole drilling operations. On proper application, the Chicago-Latrobe carbide tipped gun drill is said to prove more economical and successful than the conventional twist drill.

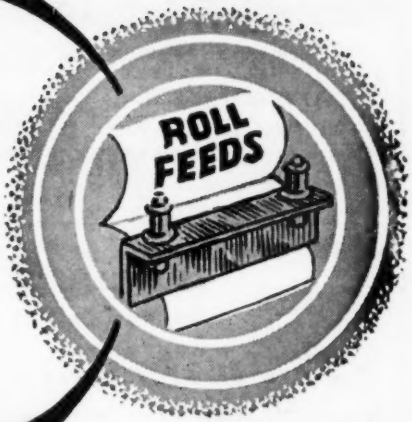
Features claimed include: 1. Enables the drilling of deep holes that otherwise would be impossible to drill; 2. Minimizes runout by maintaining closer drilling concentricity; 3. Produces a finish and hole size that in many instances are comparable to those obtained by a reaming operation; 4. Increases production due to higher speeds possible with carbide; 5. Increases production due to longer tool life (more inches drilled between regrinds); 6. Drills holes in practically

"RFC"
ROLL FEEDS

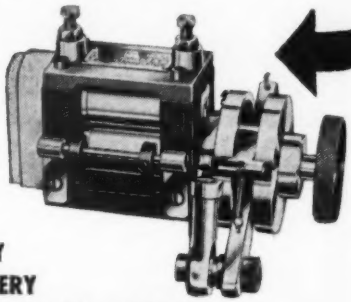
FITS ANY PRESS . . . bench or pedestal type high speed power presses. For side or rear feeding. Furnished complete with adjusting disc, mounting bracket and connecting linkage.

CAN'T SLIP . . . each wedge has 4 points of contact to safeguard accuracy.

REVERSES INSTANTLY . . . and easily. Merely shift feed finger spring from one lug to the other.



Ready for mounting!
Furnished complete.



FEEDS IN THOUSANDS . . . RFC Roll Feeds assure amazingly accurate stock movement.

MAINTAINS ORIGINAL SETTING . . . regardless of use or wear. No ratchets or pawls to wear down and "throw off" feed spacing.

EARLY DELIVERY ON STANDARD MODELS.

Write today for latest Bulletin

ROLL-FEEDS CORP.
An Electrix Affiliate
Pawtucket • Rhode Island

every material used in industry.

The gun drill is not as readily and as easily applicable as the conventional twist drill and, therefore, should be recommended with discretion. The most successful gun drill applications are performed on special deep hole drilling machines that are available commercially. The features of these machines identify the following two prevalent gun drilling conditions: 1. Piece-part rotating and drill stationary; 2. High oil pressure.

The requisite operating conditions for a gun drill application depend entirely on the characteristics of each individual job. The exact speed, feed, oil pressure and drill point that are best suited for a specific application should be developed while the job is in actual operation.

Three sizes and head styles available in adjustable pawl fasteners

Southco adjustable pawl fasteners, for quarter-turn closure or opening of hinged doors and panels on machinery and equipment, are now offered in a family of three sizes and three head styles meeting the requirements for most machine

HIGH SPEED or CARBIDE

FACING TOOLS

For MASS PRODUCTION

FOR HOLES FROM 1/16" UPWARD
17 DIFFERENT SIZES
Write For Complete Data

- CONSTANT CLEARANCE
- CONSTANT SHAPE OF CROSS SECTION
- EASY RESHARPENING
- CONVENIENT TO USE
- LONG LIFE

Dealers! Here's a Profit-Maker!

COMET Tool Co.

738-MT Broadway, New York 3, New York

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which of these materials do you engrave?

STEEL
BRASS, COPPER, NICKEL-SILVER, DIE CAST METAL, PLASTIC, WOOD, ETC.

The PREIS-PANTO Model UE-3 Engraver will engrave lettering or design on all of these materials. Built to do the work of larger machines this engraver gives greater production speed and ease of handling on the part of the operator.

Write for new Bulletin B-1 and ask for Catalog UE-3 with price lists.

PANTO

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647 State H'Way 22 Hillside, N. J.

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METAL WORKING PLANTS GET GREATER PRODUCTION AT LOWER COSTS with...

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TAILOR-MADE CUTTING FLUIDS TO FIT YOUR NEEDS.
In the comprehensive SAFCO line, there is a correct cutting oil or coolant especially designed for each type of metal and machining operation. This specialized selection makes it possible for our experienced sales engineers to help you choose the right cutting fluid for your particular job. *WRITE FOR FREE LITERATURE—TODAY!*
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Specify DESTACO FEELER STOCK

For precision fitting, checking clearances, inspection and production work. Available in 12" strips, ½" wide, in cellophane, packed 12 pieces of one thickness to a box, also in 25-foot coils. 14 standard thicknesses from .0015" to .015".

DESTACO DETROIT STAMPING COMPANY
347 MIDLAND AVENUE • DETROIT 3, MICHIGAN

CHAMPION
E-X-P-A-N-D-I-N-G
MANDRELS

Precision Model

Standard Model

give *speed* to every set-up

The flexible sleeve, mounted on tapered arbor, expands automatically to fit the hole. Inserted by hand — no arbor press needed. Always an exact, positive, concentric fit. Locked by a single mallet blow. Unlocked the same way. CHAMPION Expanding Mandrels are used in machine shops around the world. Save time, cut production costs, whether the job calls for machining one piece or a thousand.

Precision Model has expansion range of .010". Available in regular sizes to fit holes from ½" to 3" diam. Holds work to tolerances of .0002" run-out. Guaranteed for precision grinding, turning and milling operations.

Standard Model maintains close tolerances, handles material of any length bore, hard or soft metals — from thin tubes and bushings to heavy castings and forgings. A set of fourteen will fit every hole from ½" to 9½" diam.

CHAMPION *Expanding Mandrels can be made in special shapes and sizes to fit any specifications. Quotations on request. Write for descriptive folder today.*

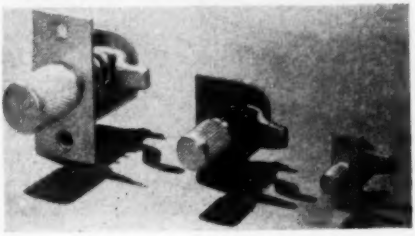
WESTERN TOOL & MFG. CO., INC.

Dept. 27 **Springfield, Ohio**

and electronic applications.

The manufacturer, Southco Div., South Chester Corp., Lester, Pa., reports that quick, simple installation, freedom from need of precision adjustment, and ready adaptation to any door or frame thickness make these Southco fasteners particularly attractive to original equipment manufacturers interested in speeding production while reducing labor costs.

Large, medium, and midget Southco adjustable pawl fasteners have been found especially appropriate in fast-moving shops and engine rooms where immediate access is needed to motors, switches, valves and other equipment.

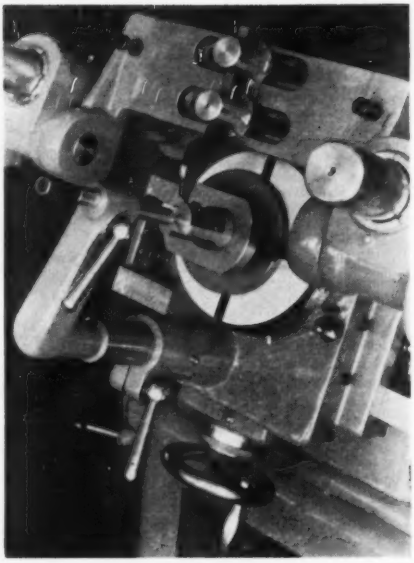


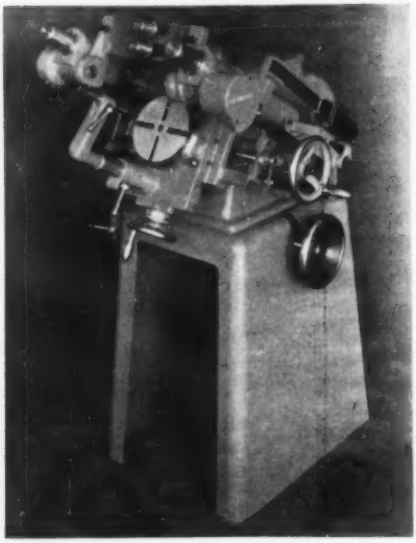
Punch and form shaper developed

Cedar-West Tool Co., Inc., Dept. MB, 90 W. St., New York 6, N. Y., announces a new method of punch manufacture with their Ottmann punch and form shaper. This is a vertical punch and die shaper that permits shaping of the whole punch from one solid piece for greater strength and rigidity. Holder plates are dispensed with.

Mounting of the work is simple. Two bolts are all that is required for mounting the work (punches, ejectors or other profiled parts). No special tools or cutters are required. Standard shaping tools are used which any tool maker can keep in good condition. The manufacture of special cutters required for a punch is said to take longer than the actual machining of the punch on the Ottmann.

Punches are generally roughly machined on shaping or milling machines and finished by hand filing. Finishing by hand filing always necessitates highly experienced tool makers. The usual practice is to fit the punch in a separate holder or base plate. With the Ottmann shaper the punch is roughed out close to the scribed line or template. Without resetting, the punch is then finished with a small tool taking fine cuts of .0005", enabling the operator to obtain a surface which requires no extra hand filing. Surfaces are parallel within .0005".





Length of stroke is adjustable 1½" to 4"; maximum length of work, 4"; maximum width of work, 8"; strokes per minute, 40, 50 or 60; power required, 1 h.p.; floor space, 52" high x 32" x 34"; net weight, approximately 550 lbs.

New method of rust prevention

Through use of an impregnated paper developed by Orchard Paper Co., Dept. BB, 3914 N. Union, St. Louis 15, Mo., manufacturers are finding simpler ways of preventing rust on shipped or stored parts.

VPI is a volatile corrosion inhibiting chemical, developed by the Shell Development Co., the research division of Shell Oil Co. It is recommended principally for use by the ferrous metal industry. The chemical vaporizes from the paper and forms an invisible protective film around the steel article which is wrapped in Orchard VPI paper. It is not necessary that the paper be in contact with the article and a tight seal is not needed. It is claimed that years of protection are provided against intense humidity and temperatures, without replacing. Temporary exposure to air does not destroy continued effectiveness. No special storing areas or methods are necessary and the

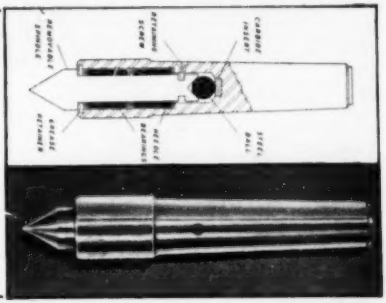
WEE LIVE CENTERS

Order Monday — Get Friday!

The Wee exclusive SMALL HEAD design eliminates tool obstructing bulk, increases machine capacity. Offers faster, chatter-free, accurate performance in lathes, grinders, hobbers. Outlast larger centers. Test one, learn why leading plants order and reorder. No. 2, M.T., $21.00. Request complete price list.

Write direct, if distributor cannot supply you

HERBERT CROSS & SON Bala-Cynwyd 2, Pa.



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THE KEYNOTE TO ACCURATE MEASUREMENT

Over twenty years of experience gives you "proved" performance — added assurance of quality production. Milwaukee Surface Plates, Angles, Parallels and Straight Edges are all made of the highest quality semi-steel and finished to exact dimensions.

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J. C. BUSCH COMPANY

Engineers and Machinists Since 1907

165 S. BARCLAY ST. • MILWAUKEE 4, WIS.

IN 11 SIZES—No. 6 to 1" N.C. In all S.A.E. sizes.

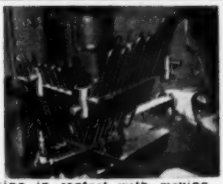
You Need an Extra Hand Now to Speed Up Production!

HEIMANN TRANSFER SCREW SETS

Here is the *faster*, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work *now*—save money too!

HEIMANN MFG., CO. • URBANA, OHIO

SEARJEANT *Safety* GUARDS for PUNCH PRESSES



Fit Any Press—30 Day Free Trial

SWEEP GUARD — Guard sweeps across feed area on downward stroke of ram. Flat arc of guard arm travel provides greatest possible protection. Entire guard easily swung aside for making press adjustments. Send for Bulletin 135.

ADJUSTABLE BASKET GUARD — Enclosure type guard, used for blanking and other first operation work, prevents operator from reaching in or coming in contact with moving die. Easily installed on any make punch press. Also available with clear plastic window. Write for free catalogs.

Other Guards designed and made by Searjeant.

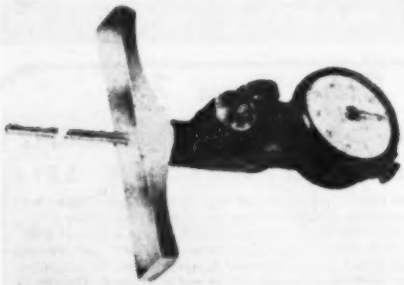
• Double Sweep Guard • End Zone Barrier Guard • Non-Repeat Mechanism

SEARJEANT METAL PRODUCTS INC., No. 150 Pittsford Rd., Mendon, N. Y.

paper is harmless to handle, safe to store and is poisonous only if taken by mouth.

Depth, groove location gage

Reliant dial indicator depth gages, made by Reliant Industries, Dept. MB, 4947 Firestone Blvd., South Gate, Calif., are



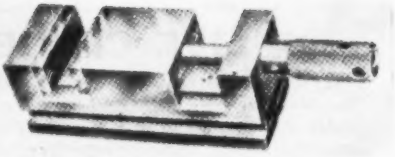
fully adjustable from 0" to 6¾", without changing measuring rods.

These depth gages are said to provide a positive, accurate and more convenient inspection of depths of holes, slots, shoulders and recesses than by conventional fixed-shank types. Longer rods may be used for gaging extreme depths.

Gages are light and easy to operate. The design allows checking to close tolerances with single dial standard range indicators, without the necessity of counting dial revolutions.

Precision toolmakers' vise

A precision toolmakers' vise made in Britain and distributed by Seaboard Tool Co., Dept. B, 254 W. 31st St., New



York, N.Y., comes in Nos. 1, 2 and 3. Measurements are respectively: Width of jaw, 1¼", 1⅞", 2½"; depth of jaw, 7/16", 11/16", 15/16"; jaw opening, 1", 1½", 2"; weight, 1-4/16 lbs., 4-2/16 lbs., 10 lbs.

Other features claimed are: (1) Precision ground on all external surfaces to a maximum permissible error for squareness of .0004" per inch; (2) dovetailed slide giving rigidity and parallel location of jaws under all circumstances; (3) slide adjustable for wear by six socket headed screws in base allowing maintenance of parallel slide; (4) hardened and ground jaws can be removed for replacement with special jaws or for reconditioning; (5) totally enclosed screw—dirt, grit or dust cannot get into the leadscrew; (6) dust-proof means of oiling leadscrew, provided by screw in end of handle; (7) all parts hardened, except leadscrew which is made of high tensile steel for long wear; (8) groove provided all round base provides means of clamping vise to machine tables, etc.

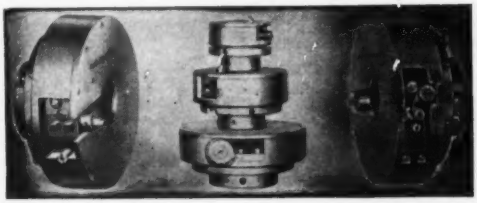
Chip breaking milling cutter

This new milling cutter is said to be designed to "hog" metal at higher speeds with heavier cuts. Unique spiral serrations break metal chips into small particles, thus eliminating excessive friction and heat. It is made by Precision Industrial Tools, Dept. B, 5937 N. Knox Ave., Chicago 30, Ill.

Made of highest quality Swedish elec-

tric steel, these milling cutters contain high percentages of chromium, cobalt, vanadium and molybdenum alloys. In mild steel, tool life has been reported as high as 60 hours between sharpenings.

Although designed to increase rough cutting speeds, it does produce a fairly finished cut. The cutter is available in sizes from 7/16" to 2".



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with Automatic Feed

One-way Tool Feed — 6, 9 and 10" sizes.

Two-way Tool Feed — 9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

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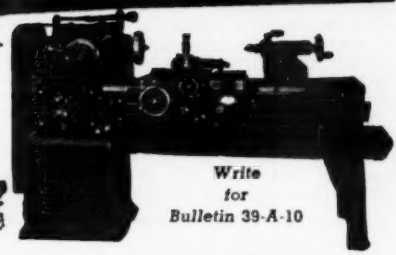
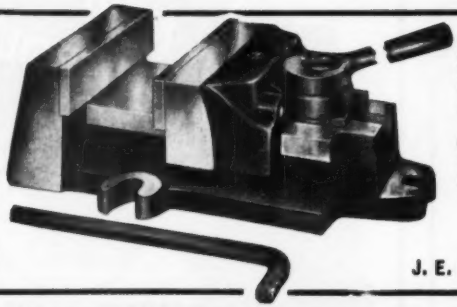
CARROLL and JAMIESON

- 16" Lathe
- 12 Speed Geared Head
- Motor Drive Timken Mounted Spindle
- Modern Design
- Liberal Dimensions



Carroll & Jamieson Machine Tool Co.
BATAVIA, OHIO, U.S.A.

Write for Bulletin 39-A-10



Plunket Quick Action Vise
for DRILL PRESS or MILLING MACHINE

Designed for production work, using an eccentric motion to apply pressure to jaws. Eccentric motion moves jaws 5/16".

Size No. 7	Net Price
6" jaws, 1½" deep, opens 4"	$83.16

Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs.

Our complete line includes Vises for Drill Presses, Milling Machines, Shapers, Grinders

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Specify **ROGERS**

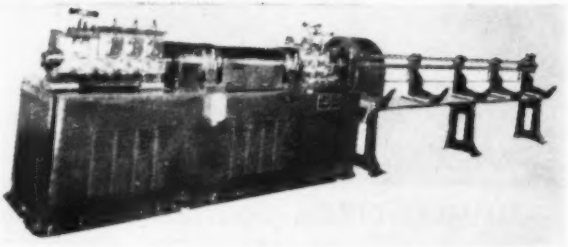
Cut your reaming costs in half with the inserted blade — both adjustable and replaceable.

Rogers **ADJUSTABLE BLADE REAMERS** combine low initial cost with **fractional replacement cost** after inserted blades are worn to adjustment limit.

JOHN M. ROGERS TOOL COMPANY

SINCE 1885 GLOUCESTER CITY, N. J.

Two redesigned wire straightening, cutting machines



Mettler Machine Tool, Inc., Dept. MB, New Haven 11, Conn., announces two completely redesigned, dual control Shuster wire straightening and cutting machines. The No. 3AV machine handles up to ½" diameter wire, maximum; No. 4AV handles up to 11/16" diameter. Both models also straighten and cut square and hex stock.

Each machine contains two variable speed units placed together at the front, allowing central control, while machine is operating, of both speed of feed and cut-off feed. Infinite variable speeds of both operations concurrently are thus obtained.

The newly designed machines are of rigid unit construction. A welded steel base provides the mounting for the roll housing unit, feed roll, rotary flier, cut-off mechanism and variable speed units.

Profile template speedy, versatile

The Ajusto template manufactured by Toolcraft Mfg. Co., Dept. B, P.O. Box 507, 531 W. Chicago Ave., East Chicago, Ind., is said to be adaptable to every branch of manufacturing and creative craft. It is possible to obtain a profile of anything from an elaborate piece of architectural design to the most intricate casting, the manufacturer claims. The time it takes to secure a profile, male or female, is a

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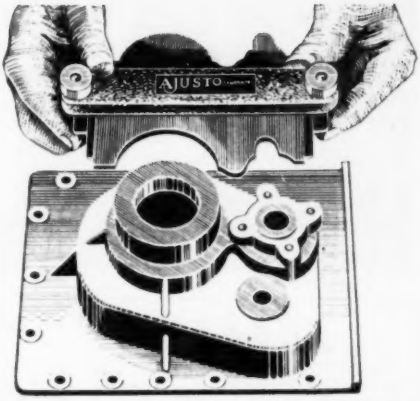
matter of seconds, where it is often hours or days, by other methods.

The Ajusto is composed of a number of very fine strips of full hard brass, and is consequently rustless. To insure great accuracy, each strip is .007" thick by .070" wide. The laminations are held in position by two specially constructed clamps, secured by two thumb screws and springs, by the tension of which the laminations are firmly held, and adapt themselves to the exact shape of whatever medium the instrument is pressed against. For even greater accuracy, the profile perfector, a rounded rod slightly larger than a pencil, and made of wood, is rolled over the male profile, while the template is held against the pattern to be secured, thus forcing each lamination tightly against the object to be copied.

Some of the applications where this new tool can be used to good advantage include: (1) metal industries—castings, die makers, forgings, lathe turning, milling machine work; (2) engineering and experimental — product development, samples, tooling, generating gear shapes, propeller curves, fan forms, spirals, architectural design such as ornamental iron, ceramic and glass shapes, orthopedic work such as artificial limbs, custom shoe work,

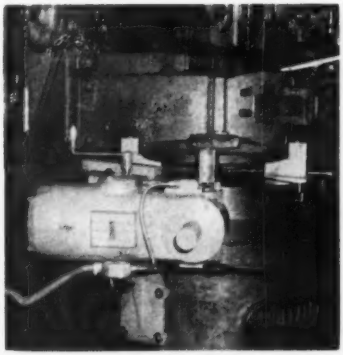


dental work; (3) woodworking industries —pattern making, model makers, mouldings, cabinet makers, furniture, boats, hobby shops of all types, etc.

Aluminum chain strong, enduring

Bison Metals, Dept. B, Buffalo, N. Y., has developed a new aluminum chain for protecting lawns, directing in and out

"VERTICAL TURRET LATHE APPLICATION"

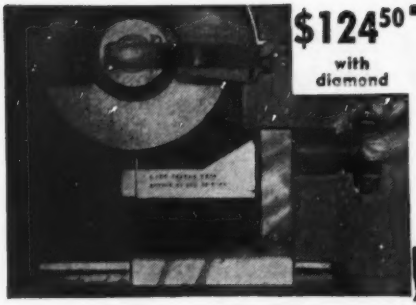


Illustrated above is a Model 12M Fen Automatic Wrench operating a 36" chuck on a Plain Vertical Turret Lathe.

The Fen Automatic Wrench with a right angle drive has proven to increase production and reduce worker fatigue on the Plain, as well as the Single and Double Indexing Vertical Turret Lathes. The Fen Automatic Wrench with a right angle drive is available in torques up to 12,000 inch lbs.

For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

THE FEN MACHINE COMPANY
28915 LAKELAND BLVD.
WICKLIFFE, OHIO



$124.50 with diamond

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Now you can cut production time without sacrificing accuracy. The new Somerset Radius Dresser is easy to set, easy to see and eliminates necessity of guard removal. "Tricky" jobs become routine operations when Somerset is employed. Write today for free fact-crammed folder and prices. No obligation.

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- Faster Machining
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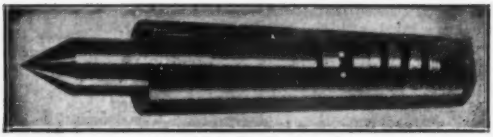

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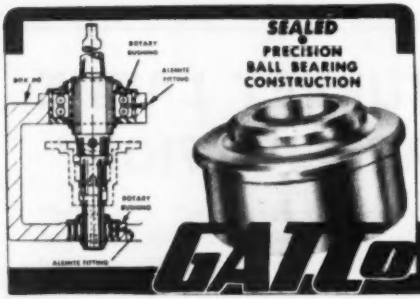
TRADE MARK REG. U.S. PAT. OFF.



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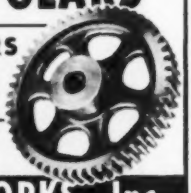

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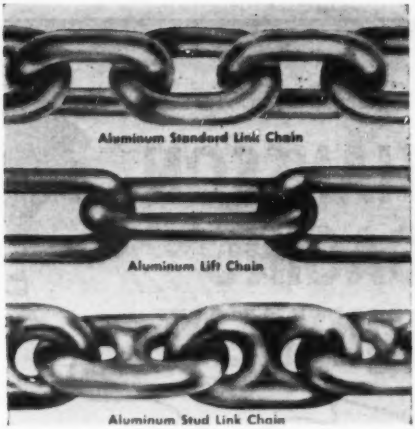

traffic, and for marine use.

The chain is claimed to be light, strong and enduring. It has 1/3 the weight of iron, needs no painting, will not rust, and is produced in standard sizes.

Automatic SPINDLE ALIGNMENT

Accurate tapping and reaming become very simple if you use a Ziegler Floating Holder, because it assures automatic spindle alignment even when the set-up is off as much as 1/32". Remember this whenever you find your spoilage losses are becoming excessively large. You can quickly solve the problem by installing Ziegler Holders on all of your machines.

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AVAILABLE LITERATURE

FREE CATALOGS AND BULLETINS AVAILABLE FROM MANUFACTURERS

For copies of the literature in which you have an interest, use the postage-paid postcard on the next page. Merely circle the identifying numbers and mail the postcard.

1. Carbide Tools. Super Tool Co., 21650-B Hoover Rd., Detroit 13, Mich., has issued a new 92-page catalog on the Super line of standard carbide cutting tools. Sections of the book are devoted to standard carbide tipped milling cutters, end mills, reamers, drills and single point tools, miscellaneous carbide tipped tools, solid carbide tools, and ejector tools.

2. "Depreciation, Deterioration, and Obsolescence" is No. 34 in the series of Management Aids—Small Business Administration, Dept. BB, 1337 E Street N.W., Washington, D.C. Leaflet discusses how to carry depreciation charges on account books, depreciation expense as an income tax deduction, etc.

3. Hydraulic Valve. Bulletin 529, Skinner Electric Valve Div., Dept. B, Edgewood Ave., New Britain, Conn., gives details and specifications covering the V10 series miniature hydraulic valve, two way or three way. For the automatic control of hydraulic systems at pressures up to 1000 p.s.i.

4. Centerless Grinder. The Royal Master Model TG-12, Royal Master, Inc., Dept. BB, Riverdale, N.J., for thrufeed, plunge, and infeed grinding, is described in available bulletin. Designed to grind small diameter forms, as well as long rods of small diameter. Tolerances as low as .0002" can be consistently held.

5. Automatic Turret Lathe. Bulletin No. 131, on the 5-D Power-Flex automatic turret lathe, Potter & Johnston Co., subsidiary Niles-Bement-Pond Co., Dept. BB, Pawtucket, R.I., is obtainable from the company. Four automatic changes of spindle speed while under cut, three selective automatic changes of feed.

6. Roll Method of Pattern Layout. Booklet issued by H. Owens Co., Dept. BB, 9300 Venice Blvd., Culver City, Calif, explains that the roll method is one which does not use the rules of geometry in order to lay out surfaces accurately. The Pattern Developer is said to be the latest advance in the use of the roll method. Through its use, the waste of time and material inherent in the old roll method is claimed to have been eliminated.

7. Shears. Faster, easier ways of selecting, setting up and operating Di-Acro shears are described and illustrated in a 14-page booklet available upon request from O'Neil-Irwin Mfg. Co., 562 Eighth Ave., Lake City, Minn. Materials which can be sheared include plastics, fiber, mica, leather, heavy gages of aluminum, chrome molybdenum, leaded brass, stainless steel.

8. Cut-Off Wheels, Heating Elements. Cut-off wheel bulletin from the Norton Co., Dept. BB, Worcester 6, Mass., has been revised. Current edition contains much information which is completely new. Booklet 146 describes the Hot Rod Crystolon heating elements, covering expected service life, operating temperatures, mounting methods, etc.

9. "The Miller that Uses its Head" gives details and specifications on Nichols millers. Available by request from the Nichols-Morris Corp., 76-B Mamaroneck Ave., White Plains, N.Y. Covered are standard hand millers; millers for tool-

room and laboratory; special application; high speed semi-automatic production; second operation milling, boring, facing.

10. "Ideas-Techniques-Designs," new 1954 edition of the Alden Handbook, Alden Products Co., Department HBB, Brockton, Mass., contains new standard components for unitizing electronic equipment. Includes data and planning sheets on plug-in packages and basic chassis, said to give equipment 30-second interchangeability.

11. Cylindrical Correction Chart, Wilson Mechanical Instrument Div., American Chain & Cable Co., Inc., 230-B Park Ave., New York, indicates corrections to be added to hardness values obtained on cylindrical surfaces when a comparison between the cylindrical hardness value and the hardness value of the same material tested flat is needed.

12. Tangent Bending. The new catalog of the Cyril Bath Co., Dept. BB, Aurora & Solon Rds., Solon, Ohio, describes tangent bending, a forming process used in metal cabinet making. There are four types of tangent bending sequence presses; production speed of fastest runs as high as 300 parts per hour.

13. Automatic High Speed Multi-Spindle Machinery. The Bodine Corp., Dept. B, Bridgeport, Conn., offers its new brochure, "A Selection of 12 Typical Case Histories." It covers the four standard sizes of Bodine machines, tooled for a variety of operations including drilling, milling, tapping, screw inserting and assembly.

14. Drill with 1000 Speeds. The "RPMster" drill, Buffalo Forge Co., Dept. BB, Buffalo, N.Y., has instant speed change, Vee-belt drive, six-spline alloy steel spindle, positive drive all-geared semi-automatic feed and alloy steel back gears. Bulletin 3257-A covers this model.

15. Milling Cutter Line. The DoAll Co., Dept. B, Des Plaines, Ill., has released a brochure dealing with its selection of cutters for milling machines. Slitting saws, screw slotting saws, shell end mills, end mills, keyseat cutters, T-slot cutters and counterbores are described, as well as end mill holders and arbors. Information on the proper application of cutters and saws also included.

16. Air Gage. Catalog No. 53B, Federal Products Corp., 1144-B Eddy St., Providence 1, R.I., describes the company's Dimensionair, including calibrated dial, single master system with specifications and accessories. Also contains automatic sorting and machine control applications.

17. High Temperature Alloys. New product bulletin, No. 301, of Firth Sterling, Inc., Dept. B, 3113 Forbes St., Pittsburgh 30, Pa., gives information on each grade of high temperature alloy offered by the company. Typical analysis, characteristics, applications, machining information, and forging instructions. The complete jet high temperature, high stress operation field from approximately 800-1400°F is covered.

18. Industrial Training. Officials charged with apprentice training in industry will be interested in Bulletin 5329, South Bend Lathe, Dept. BB, South Bend 22, Ind., which covers their standard books on lathe, drill press and shaper operations; charts and shop course book, and audio-visuals. Films, slides, scale models are on a free-loan basis.

19. Stereotype Machinery. Hammond Machinery Builders, Inc., 1600-B Douglas Ave., Kalamazoo, Mich., have issued two booklets—one, a pictorial account of Kalamazoo, prompted by the firm's 70th anniversary, and the other (Bulletin 946), a description of Hammond's products: the EasyKaster, TrimOsaw, router, and plate shaver.

20. "Through History with Standards" presents the story of standards in a light vein, through cartoons. This informative and amusing booklet may be obtained from the American Standards Association, Dept. B, 70 E. 45th St., New York 17.

21. Hardened and Ground Threading Heads. The Landis Machine Co., Dept. BB, Waynesboro, Pa., has recently revised its hardened and ground threading heads bulletin (No. F-80-5). Die heads also lend themselves to hollow milling or high speed turning operations.

22. Pivoted-Blade Power Shears. A highly-illustrated catalog, No. 2011-E, covering Steelweld pivoted-blade power shears, has just been completed by the Cleveland Crane & Eng. Co., Dept. BB, Wickliffe, Ohio. Dimensions and specifications are given for 31 different sizes of shears in the regular line, ranging from 6′ x 10 ga. to 12′ x 1″ cap.

23. Expanding Mandrels, Drop Forged C-Clamps. A new 4-page descriptive folder covering their line of Count-Centric ex-

panding mandrels and Thor-aloy drop forged C-clamps has been issued by the Le Count Tool Works, Inc., 360-B Capitol Ave., Hartford, Conn.

24. **Air and Hydraulic Cylinders.** A complete line bulletin, No. 800, has been prepared by the Lindberg Engineering Co., Dept. B, 225 N. Laflin St., Chicago 7, Ill. Heavy duty air and hydraulic cylinders are described in detail along with features of each. Descriptions of special custom built heavy duty air and hydraulic cylinders are also included.

25. **Coil Loading Hooks.** Super balanced, standard balanced, straddle type and plain coil loading hooks, as well as chain and grappling hooks, are featured in Bulletin 5N, issued by F. J. Littell Machine Co., Dept. BB, 4127 N. Ravenswood Ave., Chicago 13, Ill. Lifting capacity is plainly marked on every Littell hook.

26. **Adjusting Shim-Type Clutches.** A 3'x2' service chart describes eight steps for adjusting shim-type clutches. Five illustrations supplement information on how to check dimension A, block clutch pedal, loosen adjusting nuts, remove shims, reblock clutch pedals, tighten adjusting nuts, and check clearance between clutch release sleeve and clutch release bearing. Chart has reinforced metal edges and brass ring hangar straps. Available from Lipe-Rollway Corp., Dept. BB, 712 Emerson Ave., Syracuse, N. Y.

27. **Power Transmission Products.** Flexible couplings, variable speed pulleys and transmissions, and universal joints are illustrated and described in latest bulletin of the Lovejoy Flexible Coupling Co., 4829 W. Lake St., Chicago 44, Ill. Balanced construction of flexible couplings causes load to be transmitted by compression of the cushion materials, so that there is no wear on the metal jaws, it is claimed.

28. **Face Milling Cutter, Shell End Mill.** Kroslok milling cutter, Motch & Merryweather Machinery Co., Dept. BB, Cleveland 13, Ohio, has only three simple parts. Waffle design on face of blade mates with waffle design in body to hold rigidly. Request Bulletin No. 101-CT.

29. **Oilstone Tool Grinder.** The Plurality oilstone grinder, manufactured by the Mummert-Dixon Co., 122 Philadelphia St., Hanover, Pa., is five basic units in one: coarse oilstone wheel, fine oilstone wheel, grinding cone, leather stropping wheel, emery wheel. Featured in Bulletin No. 2851.

30. **Tracer Guided Engraving Machines.** A 24-page catalog describing the industrial application of various models of tracer guided engraving machines manufactured by the New Hermes Engraving Machine Corp., 13-B University Place, New York 3, has been released. Covers engraving of plastics, metal, glass and wood and also illustrates methods of calibrating, profiling and slotting.

31. **Drill Unit,** Holomatic Model 14, manufactured by Hause Engineering, Dept. BB, Montpelier, Ohio, is shown in latest brochure. Air actuated, completely automatic in advance and retract motions, weighs 30 lbs.

32. **Reamers, Internal Comparators.** Pratt & Whitney, Dept. BB, West Hartford 1, Conn., has issued two new booklets. Bulletin No. 563 describes and illustrates Blue Helix reamers, subjected to a special, surface hardening treatment. Circular No. 567 features Electrolimit internal comparators, using the basic Electrolimit principle of mechanical gaging in combination with electrical magnification.

33. **Die Makers Springs.** The Producto Machine Co., Dept. B, Bridgeport, Conn., has released two 4-page supplements to its No. 10 catalog, covering revised prices for the firm's line of die makers springs, and set screws and stripper bolts.

34. **Surface Pyrometer.** The Pyrometer Instrument Co., Inc., Dept. B, Bergenfield, N.J., has issued Catalog No. 168, covering the Pyro surface pyrometer. All-purpose instrument is said to give quick and accurate surface temperature readings.

35. **Rebuilt Machine Tools.** The 1953-54 winter issue of "The Simmons Way" contains numerous articles and case histories of new and rebuilt machine tools. Those interested in having their names added to mailing list for "Simmons Way" issues should write to Simmons Machine Tool Corp., 1700-B North Broadway, Albany 1, N.Y. Also available is brochure on Simmons 6" and 8" bar horizontal boring and facing machines.

36. **Gages, Setting Plugs.** Size Control Co., 2500-B W. Washington Blvd., Chicago 12, has released a new 4-page catalog describing the company's plain and thread reversible plug gages, AGD thread ring gages, and setting plugs, together with lapping by the centerless method. Write for C-53.

THIS HELPFUL LITERATURE NOW AVAILABLE

37. Carbide Tool Grinding. A brochure announcing the "Sterling Twins" has been issued by the Sterling Abrasives Div., Cleveland Quarries Co., Dept. BB, Tiffin, Ohio. New addition is the plate-mounted wheel. Formerly Sterling made just the Easymount and wheel.

38. Flexible Shafting. Bulletin 528, Stow Mfg. Co., Dept. B, Binghamton, N.Y., is intended to serve as a guide in the design, selection and installation of flexible shafting for remote control of valves and all types of equipment actuated by rotating shafts.

39. Granite Surface Plates. The Taft-Peirce Mfg. Co., Dept. B, Woonsocket, R.I., have issued Catalog No. 510, which covers their line of granite surface plates, now a standard product of the company. Bulletin points out principal features and lists specifications of the various sizes.

40. Press Brake Dies. A new 112-page die manual is now available from the Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago 19. A pictorial presentation of Verson press brake dies and special tooling, along with detailed text and tables on how to select dies for specific jobs, tonnages required, etc.

41. Gear Racks. A bulletin featuring the products of the Worcester Gear Works, Inc., 30-BB Grafton St., Worcester 8, Mass.—bevel, helical, spiral, spur and worm gears; sprockets; worms; gear racks, and ratchets—is being distributed by the company. Gear racks are precision cut on generating principle; complete pieces or cutting teeth only; straight cuts, special shapes or spirals; from the manufacturer's raw stock or material supplied.

42. Cutting Fluid Additive made by Wynn Oil Co., Dept. B, Azusa, Calif., is designed to be added to the complete conventional cutting fluid or oil. It is said to be oil and water soluble; noncorrosive; nontoxic; has an exclusive "Friction Proofing" surfacing effect, protecting metal surfaces from heat, wear, abrasion, scoring, corrosion, etc. Bulletin SP-C9 (C) available on request.

43. Filmatic Plain Hydraulic Grinders, product of Cincinnati Grinders Inc., Dept. B, Cincinnati 9, Ohio, are equipped with a two-speed device for the grinding wheel to minimize wheel cost. Catalogs: No. G-566-2 for the 6" and 10"-L sizes; No. G-603 for the 10" and 14"-L sizes.

44. Nut Running Tools. To fill nut running requirements, from television to hydraulic presses, there are more than 5000 stock types and sizes of Apex sockets, extensions, adapters and universal sockets. Write for Catalog 29, to the Apex Machine & Tool Co., 1028-B S. Patterson Blvd., Dayton 2, Ohio.

45. Internal Plug-Type Dial Gage. Bulletin 46, Comtor Co., Dept. B, 62 Farwell St., Waltham 54, Mass., features the Comtorplug, for measuring high-precision holes to fractions of .0001".

46. Stainless Steel Hardening. C. U. Scott & Son, Inc., Dept. BB, Rock Island, Ill., has published an illustrated 64-page booklet on a method of hardening stainless steel, Super Scottsonizing, which hardens the metal to estimated 2000 Brinell. (A diamond is only 999.) Booklet explains the procedure followed to prepare machined and cast stainless steel parts for this new hardening process.

47. Ram-Type Miller, product of the Van Norman Co., Dept. B, Springfield, Mass., features an adjustable cutterhead that permits horizontal, angular or vertical milling with one machine. Said to reduce work resetups, cut idle machine time up to 50%. Catalog describes machine in detail.

48. Shears. Catalog S-6, the Cincinnati Shaper Co., Dept. BB, Cincinnati 25, Ohio, illustrates and describes the features of Cincinnati shears. Accurate blanks and strip stock of many sizes can be sheared in operations flexible enough to handle new products or changes in design with no tooling or special costs, it is claimed.

49. Lathe. The new heavy-duty 12" 5300 Series lathe manufactured by the Clausing Div., Atlas Press Co., Dept. B, 12107 N. Pitcher St., Kalamazoo, Mich., features "zero-precision" Timken tapered roller bearings, and exclusive friction clutch and brake countershaft. Write for illustrated literature.

50. Universal Vise. Speedy, precision angle setups are said to be simple and economical with the 3-way universal vise of Wesson Products Co., Dept. B, 1220 Woodward Hts. Blvd., Ferndale (Detroit 20), Mich. Illustrated bulletin available on request.

51. Benders. Pedrick production benders, Pedrick Tool and Machine Co., Dept. 3B, 3640 N. Lawrence St., Philadelphia 40, Pa., are used for cold bending pipe, tube,

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reinforcing bars, angles, and intricate structural shapes. Write for descriptive folder.

52. Jig Borers manufactured by Moore Special Tool Co., Inc., Dept. BB, 728 Union Ave., Bridgeport 7, Conn., do not sacrifice accuracy for speed, it is claimed, since the lead screw measuring system built into each machine permits working to very close tolerances. Catalog and bulletins will be sent to those requesting them.

53. Drill Pointers. "How to Produce More Holes with Your Drills" is booklet issued by the Oliver Instrument Co., Dept. BB, 1408 E. Maumee, Adrian, Mich. Oliver drill pointers are said to assure a balanced cut because each lip does equal work, eliminating excessive drill costs and imperfect holes usually traced to improper grinding.

54. "This Carbide Age," an educational full color sound movie distributed by the Wesson Metal Corp., Dept. BB, Lexington, Ky., is subject of folder obtainable from the company.

55. "Wear and Surface Finish" booklet will be sent to those requesting it from the Gisholt Machine Co., Dept. B, Madison 10, Wis., specialists in the machining, surface-finishing and balancing of round and partly round parts.

56. Alignment, for better internal grinding, is discussed in booklet of Bryant Chucking Grinder Co., Dept. B, Springfield, Vt., which gives complete details on this interesting subject. Also available is booking form on new sound, color movie—free showings arranged for engineering groups.

57. Wheel Dressers. A variety of models and attachments of Fluidmotion wheel dressers are dealt with in catalog issued by the J & S Tool Co., Inc., 647-B Mt. Pleasant Ave., Livingston, N.J. J & S also manufactures a line of all-purpose jaw (machine) clamps, vises, and special tools. Write for Machine Shop Time Savers booklet.

58. Honing Machines. Seven booklets are available from Sunnen Products Co., 7959-B Manchester Ave., St. Louis 17, Mo., for the asking: No. 50, Honing Machines; No. 51, Portable Cylinder Hones; No. 55, Toolroom Honing; No. 57, Portable Honing; No. 58, External Hones; No. 60, Honing Case Histories; No. 505, Honing Supplies & Accessories.

59. Power Saws. Prepared engineering estimate sheets, as well as a complete metal saw line catalog, will be sent by Racine Hydraulics & Machinery, Inc., Dept. BB, 2054 Albert St., Racine, Wis. Capacities of saws: 6"x6" to 20"x20".

60. Uni-V-Blocks, Clamps. To meet the closer tolerance demands of modern machines, the Precision Tool & Mfg. Co.

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MACHINE and TOOL BLUE BOOK

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of Illinois, 1305-B S. Laramie Ave., Cicero 50, Ill., has developed Uni-V-Blocks, matched pairs of which are claimed to be square, parallel and concentric to each other to an extreme degree of accuracy. Clamps hold from 5/8" to 9½", with a throat depth up to 5". Literature sent without obligation.

61. A "Red Liner" for chart-recorded inspection of small gears records composite errors, magnified 200x, 400x, or 800x; 1/10,000-inch dial indicator for visual inspection. Descriptive and informative bulletin available from the Fellows Gear Shaper Co., Dept. BB, 78 River St., Springfield, Vt.

62. Coolant. Brochure issued by the Master Chemical Corp., 13-B Huron St., Toledo 1, Ohio, features Trim coolant. Properties claimed are: no rust, no gumming, no dermatitis, no stink.

63. Preformed Blanks. Catalog of the Allegheny Ludlum Steel Corp., Carmet Div., Dept. MB-48, Wanda & Jarvis Avenues, Detroit 20, Mich., contains 32 well-illustrated pages giving data on all Carmet grades, and on Carmet blanks, tools, die sections, punches, draw die inserts, etc.; also special preforming to order.

64. Milling Head. The heavy duty milling head built by Portland Machine Tool Wks., Inc., Dept. B, Broadway St., South Portland, Maine, converts outmoded planers to planer type mills. Bulletin BB gives information on products, designing service, machine tool rebuilding, and heavy milling and boring.

65. Coolant-Lubricant. Shear-Speed soluble oil, for machining, grinding and press-work, is described in Bulletin SO-53, Shear Speed Chemical Products, a div. of Michigan Tool Co., 7125-B E. McNichols Rd., Detroit 12, Mich. Four-way cut in grinding costs claimed.

66. Dial Indicators. Catalog No. 58, B. C. Ames Co., Dept. B, 28 Ames St., Waltham 54, Mass., contains information on the Ames dial depth gage, dial micrometer, amplifying dial comparator, small hole gage. "Hundred Series" indicators claimed to fit every measuring requirement.

67. Grinders. The Baldor Electric Co., 4368-B Duncan Ave., St. Louis 19, Mo., features its ball-bearing, heavy duty grinders in Bulletin 321-H. Bench and pedestal types, totally enclosed motors, bearings lubricated for life.

68. Tapping Heads. Illustrated brochure of the Procunier Safety Chuck Co., Dept. 12, 14 S. Clinton St., Chicago 6, Ill., gives complete details, specifications and prices on the improved line of Procunier high speed tapping heads.

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MACHINE and TOOL BLUE BOOK FEBRUARY, 1954

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- Self-centering holding vise.
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Send for Catalog No. IM-28, describing full line of Engraving Machines including HEAVY DUTY BENCH TYPE MODEL (200 lbs.)

NEW HERMES ENGRAVING MACHINE CORP.
13-19 University Pl., New York 3, N. Y.

69. Knurling Tool. The new catalog of R and L, Dept. B, 1825 Bristol St., Philadelphia 40, Pa., contains information on the company's knurling tool. Convenient position of the set screw cuts setting-up time. Knurl can be changed without removing the holder from the turret.

70. Hollow Tool Steel. The Crucible Steel Company of America, Dept. MT, Syracuse, N.Y., offers hollow tool steel in three grades: Ketos oil hardening, Airdi 150 air hardening, and Sanderson water hardening. Write for new brochure.

71. Rivet Setters. New catalog of the Chicago Rivet & Machine Co., Dept. BB, 3610 W. Jackson Boulevard, Bellwood, Ill., contains valuable engineering information and rivet specifications plus illustrated descriptions of 26 automatic rivet setters.

72. Cabinet Lathe. Model 918 Steelway cabinet lathe of Rivett Lathe & Grinder, Inc., Dept. MTBR, 12 Brighton St., Boston, Mass., is covered in Bulletin 918SL. Features include: instant selection of 90 to 3750 rpm cutting speeds with convenient control and dial indication; self-aligning slide rest, which automatically squares itself with line of centers.

73. Milling Machine. The 10 hp No. 3CH milling machine built by the Kearney & Trecker Corp., 6784-B W. National Ave., Milwaukee, Wis., is described and illustrated in new brochure. Extra wide feed range is claimed—32 changes, from 3/8" to 90", per minute meet requirements of new metals and cutting tools.

74. Press Room Equipment. Latest catalog of the Durant Tool Supply Co., Dept. B, 155 Orange St., Providence, R.I., includes the company's new line of power press safety guards. Booklet contains information on roll feeds, stock reels, coil cradles, stock oilers, foot presses, scrap choppers, wire straighteners, stock straighteners.

75. Surface Grinders. A new brochure, prepared by Reid Brothers Co., Inc., Dept. BB, Beverly, Mass., describes their complete line of 6"x18" reciprocating table surface grinders, with operating features, specifications and dimensions. Grinders feature finger-tip level controls.

76. Lathe Chucks. An illustrated 4-page bulletin giving complete specifications on a line of lathe chucks, including medium duty 3-jaw universal, 4-jaw independent, heavy duty turret lathe chucks, etc., all imported from England, is available from the De Witt Equipment Co., 136-B Lafayette St., New York 13.

Nicholson Air-Gas-Steam Traps

NEVER NEED PRIME

Nicholson weight-operated traps, under no condition, leak medium from a power transmission system. This prevents the costly loss of air, gas or steam occurring when inverted bucket traps lose their prime. Under such conditions Nicholson traps hold tight because they do not depend on buoyancy of float to raise valve. Three types; pressures to 1500 lbs.

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CAT'G 953

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

...to protect your investment...
save time, money and labor!

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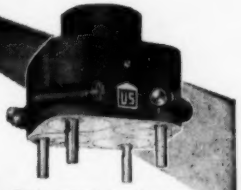
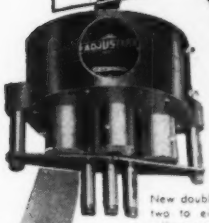
US HEADS

U. S. drill heads are built for continuous use, with full anti-friction bearing construction, for high capacity thrust loads . . . precision-bored, outboard spindle support plate.



Single eccentric type for equally spaced holes on bolt circles.



New double eccentric AdjUStafix, two to eight spindles, for any adjustment. Eliminates the expensive change in set-up from job to job by simply changing the drill pattern plate and relocating spindles. Fully automatic lubrication for either horizontal or vertical operation.

The universal joint adjustable multiple spindle type, an adaptation of a universal joint adjustable spindle, is suitable for any sensitive drilling machine. Joints self-lubricating. Designed for quick change.

We manufacture all types of multiple spindle, fixed center, adjustable and lead screw tapping heads.

UNITED STATES DRILL HEAD CO.,
616-618 Burns St., Cincinnati 4, Ohio

Power portable 1¼" bending machine

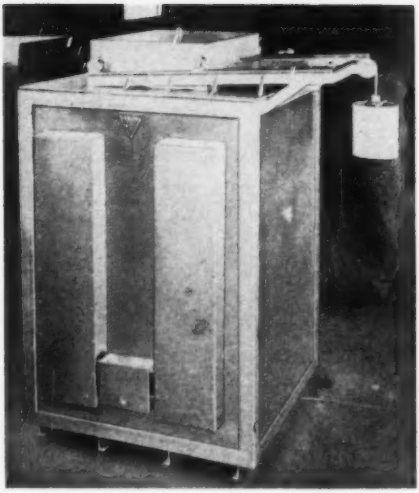
A drill press ¾ h.p. motor actuates the bending in the Wallace No. 60 bending machine when the trigger switch is pulled. The toggle switch above the trigger switch controls the forward or reverse rotation of the bend. It is manufactured by Wallace Supplies Mfg. Co., Dept. B, 1300 Diversey Parkway, Chicago 14, Ill.

Features of this bender include: (1) it can be hand carried from place to place; (2) it will bend from ½" to 1¼" IPS pipe to 180°; (3) it operates on 115V—single phase—60 cycle AC or DC current; (4) it averages 60 bends per hour with one man; (5) die forms can be quickly and easily changed for pipe sizes; (6) limit switches are preset at the factory for 0 and 180 degree rotation of bending form to prevent the possibility of overtravel in either forward or reverse direction; (7) designed to operate so that the machine can be placed anywhere along a length of pipe and then operated at that location—result, less handling of the

pipe; (8) main driving gear is case hardened and ground for maximum resistance to wear; (9) when not used as a portable bender it can be mounted on a bench or clamped in a vise; (10) all steel, arc welded construction for maximum strength and minimum weight.

Top loading electric furnace

Pereny Equipment Co., Dept. B, 893 Chambers Road. Columbus, Ohio, has announced a new pit furnace, Model PT-2550. The new Pereco furnace provides close control to 2,500° F, it is claimed.



This top-loading furnace offers a firing

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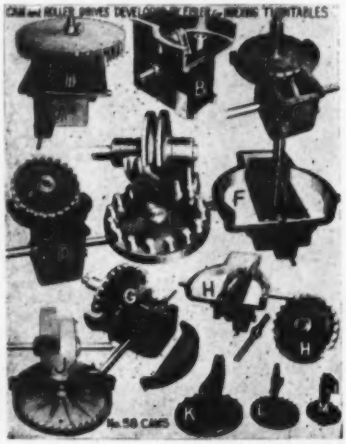
Eisler makes over 100 different types for welding, brazing, soldering, spraying, glass insulators, melting and glass glazing, with rotating stations and motorized or hand operated. Rotating tables of all kinds for over 33 years. We supply any part or complete equipment and we make special turntables to your order and cams made to order.



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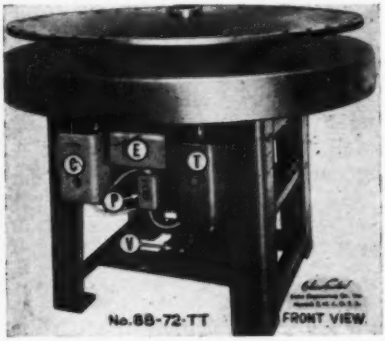
CAMS



DR. CHAS. EISLER M.E., PRES.
EISLER ENGINEERING CO., INC., 762 So. 13th Street, Newark, N. J.

1 SAVE with a Lucifer Electric Furnace on FIRST COST. Our straight line production permits economical selling price, despite use of highest quality materials throughout. Check costs on other furnaces . . . feature by feature . . . you'll save money on the Lucifer Electric Furnace EVERY TIME.

2 SAVE ON MAN HOURS with a Lucifer Electric Furnace. Less operator attention needed - Lucifer controls are EXACT. They reach SPECIFIED heat rapidly and retain SPECIFIED temperature without variation. No special experience required when you use a Lucifer Furnace.

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Furnace Size	2000°	2300°
6x 6x12"	$ 467.00	$ 548.00
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Complete with 100% automatic electronic controls.

WRITE FOR FREE literature, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

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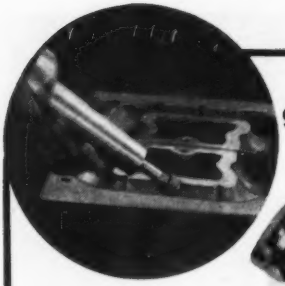
Successors to Gilbert S. Simonski Company

chamber of 18,900 cu. in. It measures 18″ wide x 25″ deep, x 42″ high. Over-all dimensions: width 48″, depth 53″ and height 82″.

The lid over the firing chamber is ball-bearing mounted, side-sliding and counterbalanced for easy action, to permit loading from a hoist or conveyor.

Self-locking chuck holds cutters rigid

The unusually wide capacity of the Dedlock chuck, which holds cutters from 2″ to 6″ in diameter, is said to eliminate the conventional use of four different adaptors. In addition, cutter changes can be carried out far more quickly and easily from ground level. Like Autolock, the Dedlock holds the cutter rigid and insures that it will run perfectly true, with evenly distributed tooth load. For machines having a taper smaller than No. 4 Morse, a damping device is fitted to eliminate vibration and add rigidity to the adaptor. This device screws from the body of the chuck against the spindle nose. Hand pressure only is required to affix a cutter to the Dedlock chuck. The



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and power you need

for faster, easier grinding

Onsrud Air Turbine Grinders give speeds up to 75,000 RPM, with ample power to hold rated speed under full load. No slow-up to wear out wheels and patience. High speed lets you use small, lower cost wheels. Air turbine motors always run cool. Light in weight. Grease packed bearings save time on tool maintenance. For information, write for Grinder Bulletin 1129.

ONSRUD MACHINE WORKS, INC., 3908 Palmer St., Chicago, 17, Ill.

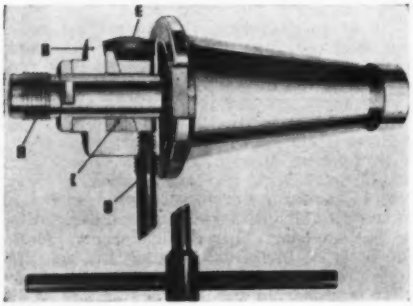
YOUR CHOICE OF THREE DIFFERENT SIZES

B-1B AIR TURBINE GRINDER 75,000 RPM

D-1A AIR TURBINE GRINDER 50,000 RPM

E-1A AIR TURBINE GRINDER 38,000 RPM

Onsrud® America's leading AIR TURBINE TOOLS



unit is made by Clarkson Inc., 320 Ontario St., Toledo, Ohio.

The cutter is screwed on to the plug (A) and located on the ground backface (B) of the spigot. Note that plug is located between flats projecting from face (B). In operation, the cutting action forces the cutter tighter and tighter against face (B) setting up pressure which tends to pull plug (A) downwards towards the work. However, any movement of the plug is prevented by the drift (C) which passes completely through a slot in the

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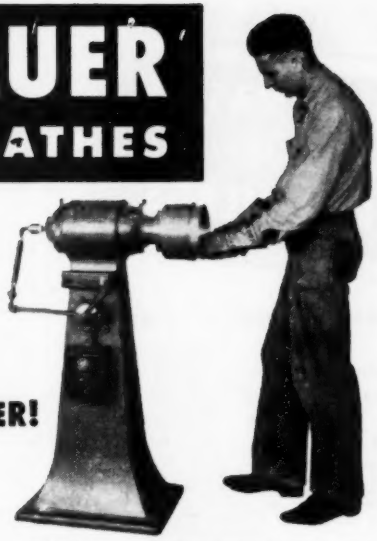
SPEED LATHES

FINISH
SMALL PARTS
FASTER, CHEAPER!



Polishing cooking ware is just one of many *jobs performed by Schauer Speed Lathes.*

Schauer Speed Lathes are used by leading manufacturers to handle an extremely wide range of secondary finishing operations on metal and plastic parts. They perform *many* jobs—filing, trimming, de-burring, lapping, polishing—in *less* time and at *lower costs.* Single speed, two speed, variable speed models. Chuck, collet and vacuum holding fixtures. Investigate their advantages for your production. You'll *save* with Schauer!

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SCHAUER MANUFACTURING CORP.

4502 Alpine Ave., Cincinnati 36, Ohio

body of the plug. The heavier the load on the cutter, the heavier the thrust imparted by the angular top-face of the slot on the angular face of the drift. Thus the Dedlock chuck automatically locks the cutter in its proper position, assuring rigidity and accuracy. To release the cutter, a slight turn of the key (D) forces the drift to move radially, which allows the plug to move axially away from the chuck. This releases the cutter, which can then be removed by hand pressure. The drift is retained at all times by spring and retaining screw (E).

Metal hardness testers feature automatic load changing, magnified optical readings, loads starting at 5 KGM

Said to be the first to provide automatic load changing and magnified optical readings without extras, hand-operated metal hardness testers have been announced by the Opplem Co., Inc., Dept. MB, 352 Fourth Avenue, New York 10, N.Y., importers from Italy of the Galileo

Only

THRIFTMASTER
Universal Joint Type
DRILL HEADS

have these exclusive* features

***Standard Full Ball Bearing Construction, including Spindles**

Driving assembly is Full Ball Bearing mounted with 3 Bearings on each spindle. Thrust load carried by radial thrust bearings.

***Standard Slip-On and Slip-Off Template Construction.**

For accurate setting and locating spindle brackets are machined to receive slip-on and slip-off template.

6 **Standard Models** . . . Models U-608 and U-1000—Ball Bearing. Models U-620B and U-1012B—Plain Bearing. 11/16" or ½" min. centers. Models U-608-BS and U-1000-BS—Ball Bearing Gear Case, Plain Spindles.

Semi-Standard Heavy Duty Full Ball Bearing . . . ½" in Cast Iron—1-7/16" min. centers—7⅛" or 9¾" dia.

½" in Steel—1-13/16" min. centers—7" or 9⅝" Dia.

Also Larger Adaptations and Full Line of Fixed Center Drill Heads.

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Subsidiary of Thompson Industries, Inc.

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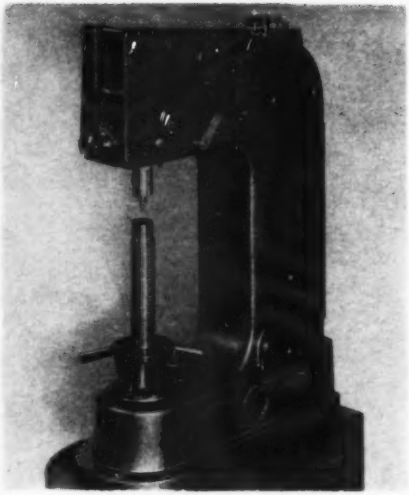
1030 N. PLUM STREET
LANCASTER, PENNA.

Also Makers of
DORMAN AUTOMATIC REVERSE TAPPERS

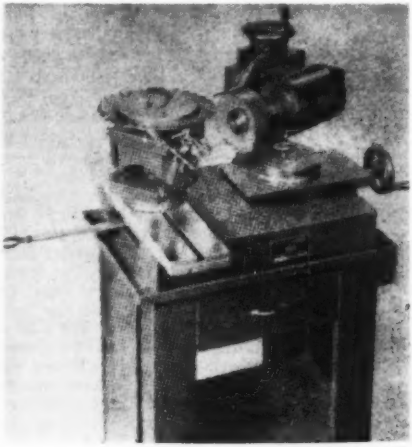


line of optical and precision instruments.

Loads start at 5 kgm. The Galileo standard hardness tester handles Rockwell measurements from 30 to 1000 Brinell units, Brinell tests, special loads and Vickers measurements.

Knife, saw grinders announced

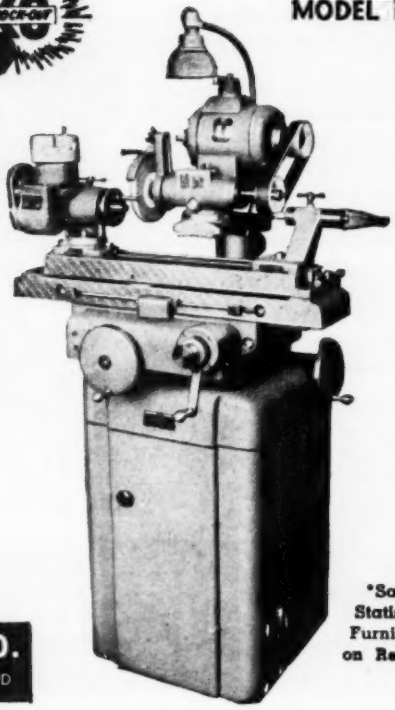
Two new grinders have been announced by Samuel C. Rogers & Co., Inc., Dept. MB, 183-205 Dutton Ave., Buffalo 11, N.Y. They are the Type DH carbide saw



There's a reason 76%*

of all popularly-priced Tool and Cutter Grinders sold in 1952 were "Knock-Outs"

MODEL B860



Will do anything that machines costing 2 or 3 times more will do . . . yes and in less time.

Distributed Only Through Franchise Dealers

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ABERDEEN, S. D.

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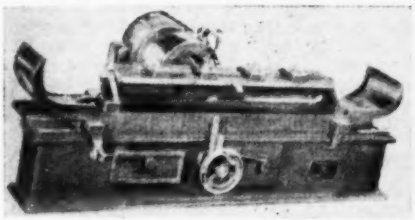
grinder and the Type EE knife grinder.

The DH is a bench type grinder designed to sharpen circular carbide tipped saws. It is equipped with a saw mounting fixture which is mounted on a traversing table for handy adjustment. The mounting fixture is adaptable for grinding any saw within its capacity (6" to 24" dia. saws), either backing off tooth, grinding tip or for side dressing. A fixture for sharpening cutter heads is also available.

The EE is a fully automatic bench type knife grinder featuring a reversing motor drive to operate table, providing a smooth running and reversing action unusual for small grinders. The L-shaped bar may



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M-100

THE PRECISION BENCH DRILLING MACHINE

ACCURATE because table and column exactly squared one to the other.

LONG LIFE because of hardened and ground spindles.

SAFE because motor, driving belt and spindles are entirely enclosed.

STRONG, RIGID for maintained accuracy.

SMOOTH AT HIGH SPEEDS — sealed ball bearings throughout for smooth operation from 4000 R. P. M. to 10,000 R. P. M.

MODELS — with 1, 2, 3 and 4 spindles.

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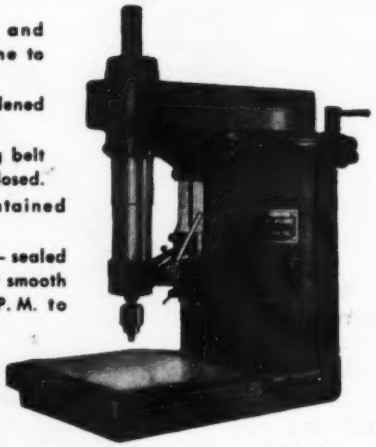


THE SIGOURNEY TOOL CO.

Hartford 6, Conn.

Sole Sales Agent

PRATT & WHITNEY

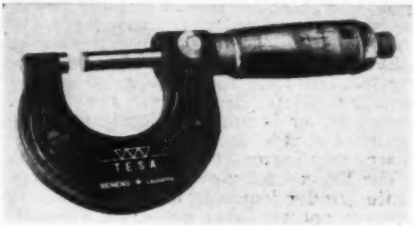
Division Niles - Bement - Pond Co. West Hartford, Connecticut

1SGS2

be rotated to any position for grinding knife edges at proper bevel and is equipped with an adjustable stop gage for re-positioning; edge up or down is possible. The grinding head swivels to proper position for hollow grinding or may be set at 90° angle to the reciprocating table for facing. A thin knife clamp for knives 5/32″ or less in thickness, and a wet grinding attachment are also available.

Easier reading micrometer

A new micrometer made by Tesa Ltd., Switzerland, and distributed by Precision Instrument and Tool Co., Dept. B., 25 Broadway, New York 4, N. Y., claims new



GET MORE PARTS with . . .

PRODUCTION PROVED B. Jahn

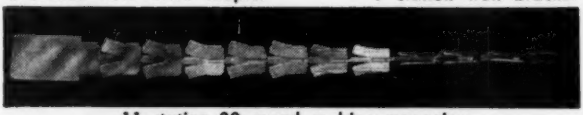
DIES

Startling production results —and savings—are guaranteed by B. Jahn dies because each is engineered with ingenuity and craftsmanship that pays off throughout prolonged die life . . . designed for performance *and performance alone* . . . "production proved" to work — and keep on working — in the customer's equipment to his complete satisfaction.

11 station toe plate for ice skate

6 station fluid drive coupler

7 station wall bracket



11 station 30 round carbine magazine

8 station parachute buckle

9 station car cigarette lighter part

Send today for the fact-packed, picture story of "B. Jahn Production Proved Dies."

B. Jahn

THE B. JAHN MANUFACTURING COMPANY, NEW BRITAIN, CONNECTICUT

clearness and ease in reading, plus precision. It is called the Micromaster. The micrometer shows the measuring result automatically. Readings can be made with accuracy because from whatever angle the drum of the Micromaster is read, the same measuring result will be seen to 1/10000". In the case of an ordinary micrometer, the graduations on the thimble and the sleeve are placed one above the other (parallax error), whereas in the case of this new type instrument, these graduations are arranged side by side.

Versatile speed selector

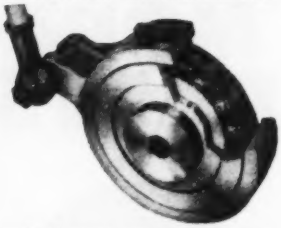
Manufactured by Meck Mfg. Co., Dept. B, 547 W. Lake St., Chicago 6, Ill., the new Meck speed selector makes it possible to machine holes of various diameters on light duty drill presses, with only simple tools such as a drill bit for pilot holes, or fly cutter for boring.

The unit was developed to provide a means for decreasing and increasing the speed of drill presses beyond their normal range. It is adaptable to most four (2"-3"-4"-5") or five (2"-3"-4"-5"-6") V-belt

DURANT

INVESTIGATE THE DURANT LINE OF PRESS ROOM EQUIPMENT

INCREASE PRODUCTION! REDUCE COSTS!



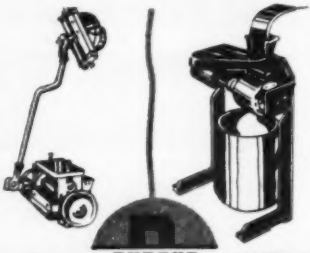
THE SELECT-O-MATIC ROLL FEED INDEXER

Replace your present roll feed clutch with this DURANT SELECT-O-MATIC multi pawl indexer that accurately controls close feeding due to its 6720 possible stations.

Write for complete information on our line of economically priced press room equipment

ROLL FEEDS

Choose from seven different models that take stock from 2" to 5" wide — Insures accurate feeding — Reversible — Simple to install.

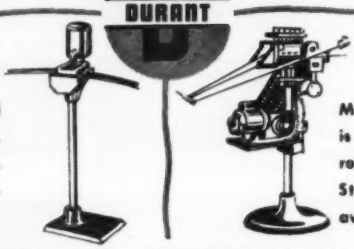


SCRAP CHOPPERS

Fits all power presses and has simple electrical plug in installation. Low first cost pays for itself — Pennies per day to operate.

STOCK OILERS

Prolong die life as they clean and lubricate stock in one operation. Variety of models are available. Eliminates hand oiling yet inexpensive.



STOCK STRAIGHTENERS

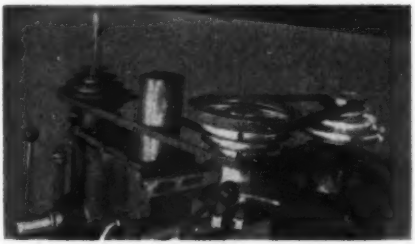
Motor driven equipment (shown) is perfect for thin materials. Top rolls are adjustable for thickness. Standard straighteners also available.

Inquire about our STOCK REELS, FOOT PRESSES, COIL CRADLES, WIRE STRAIGHTENERS, and PRESS FEEDS. Complete free catalog ready now. Write today.

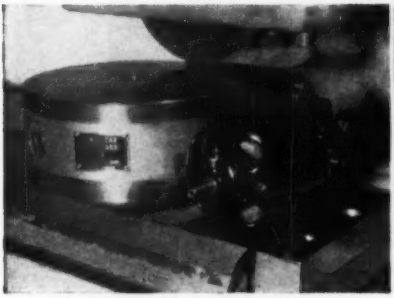
DURANT TOOL SUPPLY CO. 55 ORANGE STREET, PROVIDENCE 3, R. I.

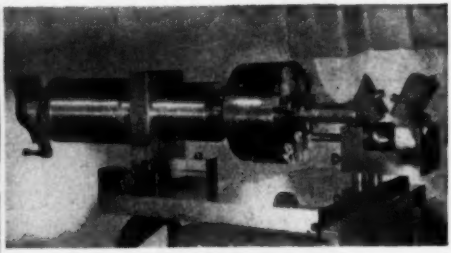
pulleys. A choice of 13 speed selections is accomplished through two belts and a set of pulleys mounted in the head. A standard four step pulley is coupled with a 6" interchangeable pulley. If additional reduction is desired, it is a simple matter to substitute an optional 8" or 10" pulley for the standard 6" pulley. The shaft and double row ball bearing, mounted in the selector bearing housing, are one compact unit, with ample supply of lubricant provided for the life of the bearing.

The selector can also be used for verti-



NO SET UP TIME REQUIRED
SIMPLY PLACE ON GRINDER CHUCK OR TABLE





THREAD GRINDING FIXTURE

ROTARY
GRINDING ATTACHMENT

- CAPACITY 12" DIAMETER.
- HEIGHT 5"
- MAGNETIC CHUCK 7" DIA.
- MOTOR DRIVEN.
- R.H. ROTATION ON BALL BEARINGS PRELOADED.
- FOR WET OR DRY GRINDING.

- CAPACITY 4" DIAMETER.
- THREAD LENGTH 2".
- ANY PITCH OR SPIRAL CAN BE GROUND - O.D. OR I.D.
- INTEGRAL WHEEL DRESSER PRODUCES CORRECT R.D.
- HOLLOW SPINDLE FOR CHUCK OR COLLETS.

CAN ALSO BE USED FOR CYLINDRICAL GRINDING ON THE SURFACE GRINDER.

GREAT NEW TOOLS BY

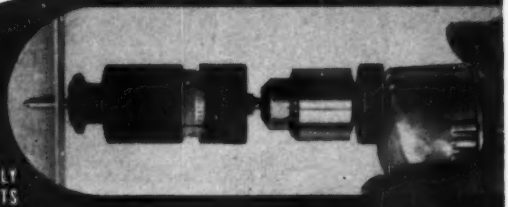
AMERICAN STANDARD CO., PLANTSVILLE, CONN., U.S.A.

cal installations on lathes, arbors, etc. Reduction ratios are approximately 7½ to 1, for standard 6" pulley; 10 to 1 for 8" interchangeable pulley; 12½ to 1 for 10" interchangeable pulley. The speed increase ratio is approximately 4.1 to 1.

Tungsten carbide plug gages with diameter range from .025 to .760

S & E Machine Products, Inc., Dept. B, Bridgeport, Mich., have announced a new line of tungsten carbide reversible plug gages. S & E have extended the size range beyond the customary .510 diameter American gage design standard maximum to .760 diameter. This provides the convenience and economy obtainable by reversing the gaging members to increase the useful gage life, to gages in the .510

NOW AUTOMATIC
Hole DEBURRING

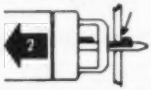


AUTOMATICALLY DEBURRS PARTS LIKE THESE!

with NOBURMATIC TOOL

New Noburmatics deburr and chamfer front and inaccessible back hole faces in ferrous and non-ferrous sheets, plates, extrusions, castings and forgings ***in one automatic operation.*** Used in drill motors or stationary machine tools, Noburmatics produce uniform deburring with high accuracy, increase production line speed. Made in all drill sizes from 1/8" (.125) to F(.256).

Entry Noburmatic enters hole, advances to limit stop, DEBURRS FRONT FACE. (Rear cutter now projects.)



Withdrawal BACK FACE DEBURRED. Cutter automatically retracts. Tool ready for next cycle.

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NOBUR MANUFACTURING COMPANY
717 N. VICTORY BLVD., BURBANK, CALIF.

diameter to .760 diameter range which would ordinarily be fabricated in non-reversible taper-lock design.

Gaging members are ground and lapped to exacting finish and size and are available in tolerance classes XX, X, Y and Z. They are checked with modern equipment in a constant temperature, air conditioned room.

Collet type handles of polished aluminum are provided in proportionate sizes to accommodate the full range of member diameters. Clamping nuts are anodized in colors green and red to denote go and no go members respectively. Handle markings are engraved and filled rather than stamped to provide more legible size identification.

Dial saw cuts grooves, holes

The Dial saw, manufactured by Robertson and Ruth, Dept. B, Box 534, Elmhurst, Ill., is said to cut any size hole from 1⅛" to 2½" diameter in metal, wood, plastics, etc. Utilizing three electronically heat-treated high-speed steel cutting

Atlantic RAKER SET BANDS
SAVE YOU TIME AND MONEY!

Yes, the instant you order Atlantic Raker Set Bands you're in for cleaner, more precise cutting . . . you're dollars and hours ahead . . . you're due for more work per blade than you've ever had before — and here's why!

Raker Set Bands glide through the toughest metals with amazing accuracy — cut true clean through to tolerances as close as .002" — with "finished product" results on job after job.

Atlantic's individually milled, heat hardened teeth and ultra-flexible bands virtually eliminate checks and flaws—prolong band life, slash downtime.

FREE—Send today for the graphic story of Atlantic's family of fine saws. If you have a specific saw application you are wondering about, include a brief description — it will meet with interested engineering attention and be promptly acknowledged.

Atlantic

ATLANTIC SAW MFG. CO., INC.

Brewery St. New Haven, Conn.

ATLANTIC

blades which are adjusted simultaneously by rotating a calibrated dial, a twist of the engraved dial sets the diameter desired for various size holes. For tool rooms, model shops, wood and metal workers, pattern makers, electrical and radio laboratories and shops, plumbers, hobbyists, experimenters and many other craftsmen, it makes circular disks, washers, gaskets, bosses, plugs, etc. By removing the pilot drill, the Dial saw can be used as a rotary planer or grooving tool, cutting any width groove from 1⅛" up, and is suited for use as an inlaying tool. Can be used with hand drill, both electric and manual; drill press, lathe and milling machine. The Dial saw is accurately machined throughout, and has an attractive rustproof jet black finish with dial calibrations in white. Shanks are round with three flats milled for chuck mounting. Comes complete with two sets of blades (one set for metal, one for wood and

Announcing!

third in a series NEW LINE OF

SEIBERT Production Tools

Seibert Drill Drivers

MADE TO G.M.C. STANDARDS. Seibert hardened drill drivers for straight shank drills answer the problem where close centerwork is necessary. Close attention to all details in the manufacture of these precision tools assures that the bore and shank are concentric within .002 gauged at a distance equal to the projection of a standard drill.

Seibert 4-Way Split Tap Drivers

MADE TO G.M.C. STANDARDS. Seibert hardened and ground tap drivers are split 4-ways to insure a true running tap and positive drive, reducing misalignment and tap breakage. Ideal for close center work, bores are ground concentric with taper.

Seibert Center Drill Drivers

A precision multiple center drill and countersink driver for close center work. Positive drive with drill tip protected.

Seibert Woodruff Keyseat Cutter And End Mill Drivers

Quick and inexpensive method of tooling to drive your end mills and Woodruff keyseat cutters.

SEIBERT

Quality

Write, wire or phone for complete details and our catalog.

SEIBERT & SONS, Inc.

CHENOA, ILLINOIS

plastic materials) and pilot drill. It is available in two shank sizes: (model 250) ¼" shank, (model 375) ⅜" shank.

New E-6010 electrode

A new, easy operating, mild steel E-6010 electrode, "Fleetweld 51," has been put on the market by The Lincoln Electric Co., Dept. B, Cleveland 17, Ohio. It is a shielded arc electrode designed for all position welding with DC.

The new "Fleetweld 51" is said to be well suited for welding of all types of joints in the overhead or vertical position. It is especially well suited for "vertical up" welding. It produces flat faced fillets when welded in a vertical

Fit parts accurately

INDIA® and HARD ARKANSAS* OILSTONE FILES

• For really close work – fitting machine parts, making dies and precision tools, deburring, etc., INDIA and HARD ARKANSAS shaped oilstone files have no substitute. They enable you to meet close tolerances on all surfaces, no matter how intricate. Over 35 different shapes and 97 sizes to choose from. Use INDIA for regular work, HARD ARKANSAS for super-fine finishes.

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Division of NORTON Company

▲ COATED ABRASIVES
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▲ PRESSURE SENSITIVE TAPE

position and reduces sagging or excessive convexity on welds made in any position.

"Fleetweld 51" may also be used with excellent results for welding galvanized, dirty or rusty plate; welding pipe in all positions with "vertical up" techniques; applications requiring maximum penetration and applications requiring physical properties of an E-6010 type electrode. It is a deep penetrating electrode. Arc characteristics secure excellent root penetration, and the weld is fast freezing with an exceptionally small volume of slag. The deposits have excellent physical properties.

This new electrode is available in 14" lengths and in diameter sizes ⅛", 5/32" and 3/16".

Free-running surface increases floor stamina

A mastic flooring that is said to meet the demand of modern industrial traffic requirements is a recent development of Flash-Stone Co., Inc., 3723-B Pulaski

"U.S." No.1
HORIZONTAL
MILLING
MACHINE

★ ★ ★ ★ ★ ★ ★

America's
Number One
Low Cost
Miller.

A Rugged precision hand-miller easily adapted to high-speed hand or power-fed production.

Send for complete data on specifications and accessories.

THE
U. S. BURKE
MACHINE TOOL DIV

★ ★ ★ ★ ★ ★ ★

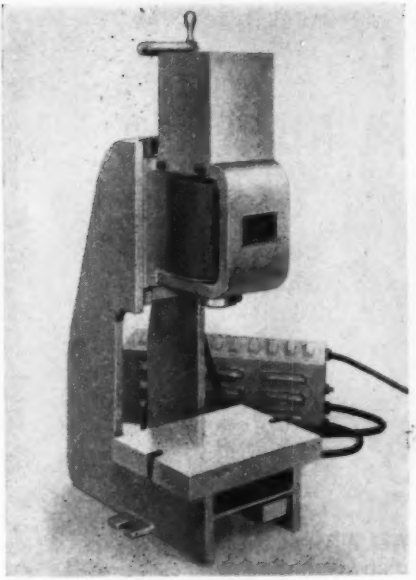
Brotherton Road 1, Cincinnati 27, Ohio

Ave., Philadelphia 40, Pa.

Trade named Liggite, this floor incorporates a binder which increases stability without loss of tensile strength, it is claimed. There are no humps at the edges of the installation, because the material feathers well. Liggite is resistant to attack by grease and oil; it requires a 24-hour waiting period after installation before it is ready for use.

Heavy-duty electric impact hammer

Black & Webster, Inc., Dept. 75, 445 Watertown St., Newton 58, Mass., has introduced a heavy-duty electric impact hammer, the Model C Electropunch. This bench model unit is said to be capable of delivering impacts adjustable from a few pounds to 10,000 lb. at rates up to 75 blows per minute. It is suitable for heavy-duty staking, crimping, punching, forming,



riveting, stamping, and marking.

Hammer operates on the electromagnetic principle, deriving its power from a specially designed solenoid. A selenium rectifier is used to transform a.c. to d.c. It can be plugged into any 110 volt a.c. outlet, and is operated by either a momentary contact hand, foot or automatic switch, or automatically with a limit switch, when work is inserted under the ram.

The Model C is simply designed; the open back, double C frame is made of steel weldment. Machine has only one moving part: an integral unit consisting of the armature and spindle which moves in a 3" honed bronze bearing. The spindle is made of nonmagnetic steel and is guided to prevent rotation.

Shut height can be adjusted from 1¼" to 6¾". Tool hole is ⅝" dia. Electropunch weighs 95 lb., stands 25⅝" high (with head elevated) and has a power stroke of 2". The worktable is 7⅞" x 6".

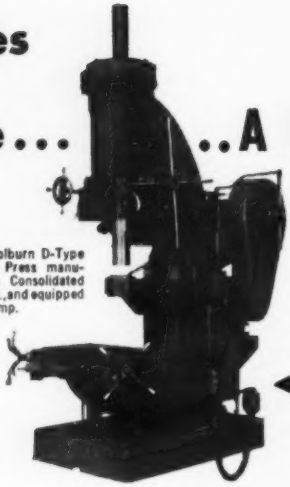
Hydraulic screw machine feed eliminates feed marks

An attachment for feeding screw machine stock, developed by Aurora Precision Devices, Inc., Dept. B, Geneva, Ill., is said to be obtaining rate increases un-

Saves You Time...

..A RUTHMAN GUSHER

COOLANT PUMP



Illustrated is a Colburn D-Type Heavy Duty Drill Press manufactured by the Consolidated Machine Tool Corp., and equipped with a Gusher Pump.

You get split second coolant flow, controllable as to volume, with a Ruthman Gusher Coolant Pump. There is no need for packing or priming and the pre-lubricated heavy-duty ball bearings need no further attention. You'll save valuable time for the entire life of your metal cutting machinery when you specify Gusher Coolant Pumps.

Write now for full information.

THE RUTHMAN MACHINERY CO.

1816 READING ROAD **CINCINNATI, OHIO**

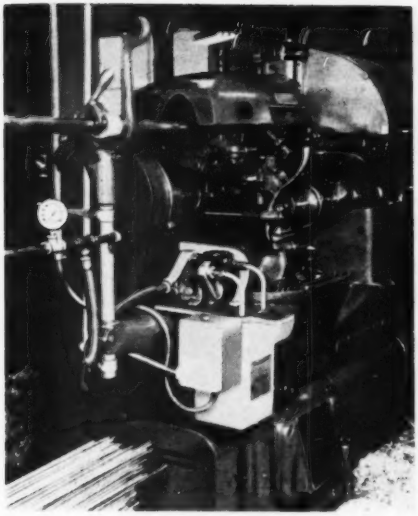
der production conditions. Although new to the general market, the Hydra-Lite has been tested during four years of actual production.

The attachment's hydraulic feeding eliminates feed fingers, making it possible to feed ground and polished bars without the usual scratches, mars and digs that result in excessive scrap.

An exclusive signal light turns on automatically as the bar end approaches, enabling the operator to be ready with a new bar without interval delays.

The new feed is a hydraulic, self-contained, independent unit, equipped with its own hydraulic pump and supply of oil; this eliminates filters and clogging of collets.

Models are available for all No. 00, 0, and 2 Brown & Sharpe machines and feed stock from 1/16" to 1⅛" dia. Oil pressure can be adjusted to feed up to 5" piece lengths. Under the heavier pressures, necessary to feed large bars, a metering valve is provided on the No. 2 feed to automatically control feet per minute of bar travel, eliminating excessive shock and possible damage on turret



parts. On all feed sizes, constant pressures are said to be maintained throughout feed, regardless of length of bar stock.

ALL in ONE TOOLHEAD

BORING
FACING
TURNING
GROOVING
UNDER-CUTTING

SIX SIZES AVAILABLE

All Have Power Feed for Facing

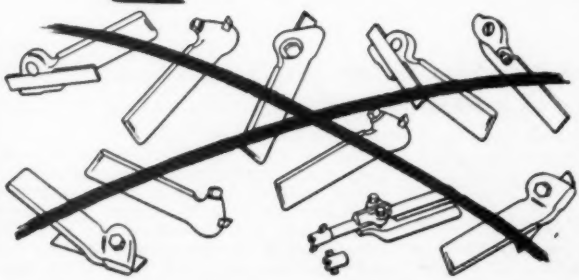
Write today for complete details.

CHANDLER TOOL CO.
Muncie, Indiana

Model "D"

COMBINED BORING & FACING TOOL HEADS
Chandler-Duplex

ONE ALL-PURPOSE TOOL HOLDER INSTEAD OF TEN



ONE tool holder for all positions . . . No tool chatter . . . can do internal boring or internal threading . . . Ideal for carbide tools . . . Bit sizes: 1/4", 5/16", 3/8", 7/16", 1/2", 5/8".

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ARROW TOOL & REAMER CO. • Established 1916

Manufacturing skill and tool making experience for over 37 years — adds up to preference for Arrow End Mills.

Call your Distributor or write direct for literature

ARROW TOOL & REAMER CO.

418-422 Livernois Ave. • Detroit 9, Michigan

Versatile air powered broaching fixture cuts broaching equipment costs on wide variety of production parts

A new versatile air-powered broaching fixture, said to be designed to cut broaching equipment costs and speed delivery, is announced by National Broach & Machine Co., Dept. B, 5600 St. Jean, Detroit 13, Mich. The horizontal, self-contained fixture will broach holes, keyways and contours on a wide variety of production parts, it is claimed.

The compact fixture consists of a cast iron base with two integral vertical flanges. A 5″ diameter air-hydraulic cylinder having a 25″ stroke is mounted on a flange at one end of the base. The other flange in the middle of the base supports the work rest plate. Two hardened and ground steel guide bars sup-

NOW greater versatility
greater efficiency

with Wells Metal Cutting Band Saws

featuring an Expanded Range of Cutting Speeds

TO IMPROVE cutting efficiency and production, three models of the Wells Metal Cutting Band Saw line are now available with expanded range of cutting speeds as standard equipment.

The new cutting speeds coupled with such proved Wells advantages as sturdy construction, ease of operation, real dependability and low cost make these machines even more profitable for you to use. Ask your Wells Dealer for full information or write, requesting catalog G-52 giving specifications and design details for all models.

Wells

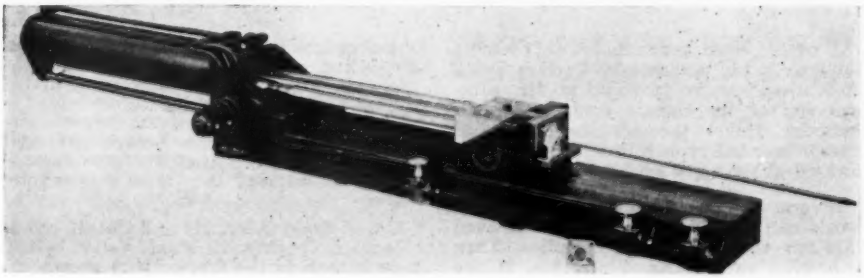
Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
707 Coolidge Ave. - Three Rivers, Mich.

ported by the two flanges guide an automatic broach puller mounted on the end of the air cylinder rod.

Linear ball bushings are provided in



NEW AUTOMATIC BAR FEED ATTACHMENT

Kalamazoo's new Bar Feed Attachment for Models 816, 824, 8C and 1220 *Kalamazoo* Metal Cutting Band Saws converts them to *completely automatic* cut-off machines. Combines low cost with high production and labor savings.

Kalamatic is a completely hydraulic self-contained unit which opens saw frame to correct height, opens vise, feeds stock to correct length, clamps vise and lowers frame at controlled rate — all automatically. Eliminates operator fatigue, increases blade life.

Feeds rounds, flats, square, hex, pipe, tubing, etc., any length from ⅛" to 12", or longer if required.

Ask your dealer for a demonstration or write for descriptive material and name of your nearest dealer.

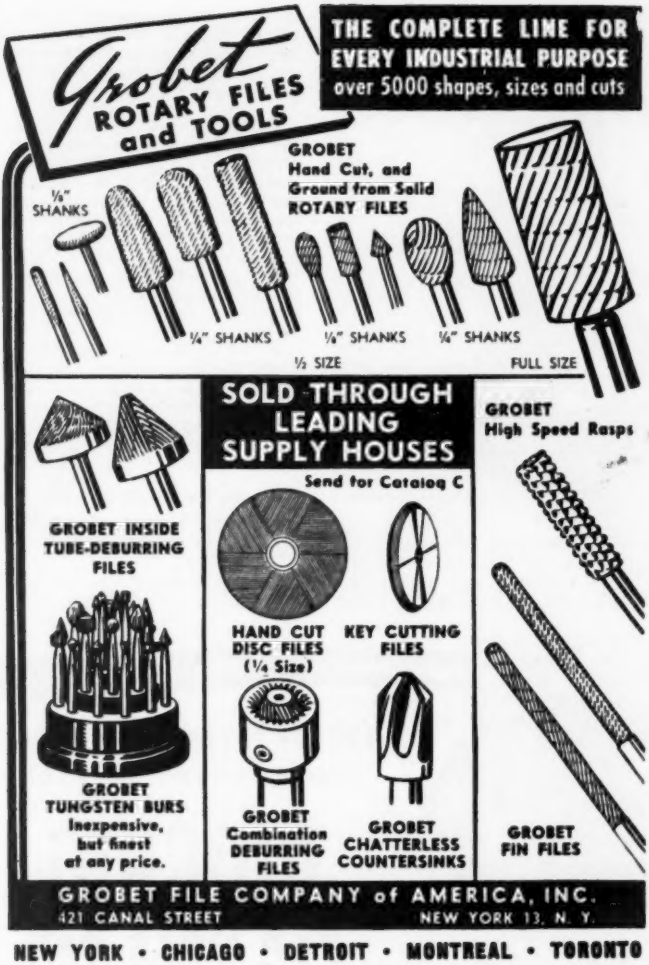
MACHINE TOOL DIV. *Kalamazoo* TANK and SILO CO.

232 HARRISON STREET • KALAMAZOO, MICHIGAN

the puller head guide holes to promote long wear life and reduce friction loads. A four-way valve mounted at the cylinder end of the fixture controls the air cylinder travel through the action of three manual controlled pilot valves located at the right of the fixture plate.

In operation, a part is placed on the work rest plate and the broach inserted through the part into the puller. Then two pilot valves (No. 1 and No. 2) are simultaneously depressed, causing the air cylinder to pull the broach through the part. After the part is removed from the rest plate, two pilot valves (No. 1 and No. 3) are depressed, causing the air cylinder to return the broach through the fixture and release it for removal before beginning the broaching cycle again.

Cycle time to rough and finish close tolerance, highly finished valve spool hole broach in the tractor part shown in



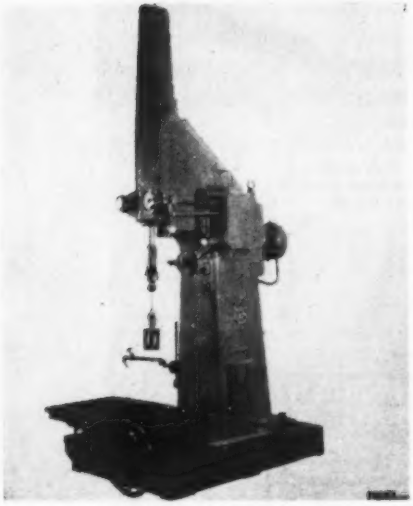
the illustration is 15 seconds.

The broaching fixture has a 1400 lb. broach pull capacity with an 80 psi air line pressure. Rate of broach travel is adjustable through a control valve in the hydraulic end of the cylinder. The broach centerline is 3½" above the work surface at the rear of the rest plate.

The fixture is 89" long over-all, 12" wide and 10" high. It weighs approximately 600 lbs.

Stepless control for boring machine

Klingelhofer Machine Tool Co., Dept. B, Industrial Park, Kenilworth, N.J., are distributors for a German boring machine with features including: Stepless control, enabling the rotary speed and stroke speeds to be adapted accurately to any bore and material dealt with, for maximum utilization and efficiency; speed variation during working, without disengaging the drive or otherwise stopping



the machine.

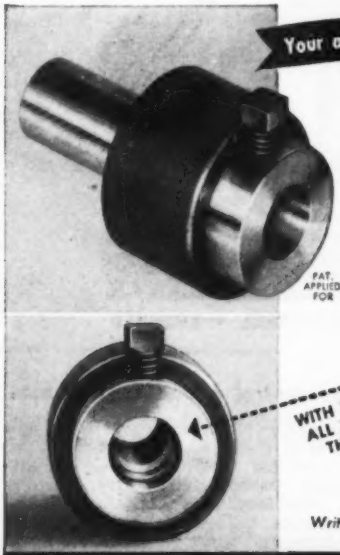
The guides and driving mechanism for the honing spindle are housed within the column. The baseplate, on which the column is mounted, is designed at the front to accommodate extra large workpieces direct, or a work table having longitudinal and transverse adjustment by hand. The baseplate interior serves as a coolant tank.

Particular attention has been paid to the design of the table, on which the workpiece is clamped with suitable supports or in a special fixture. The upper part slides in accurate guides and is longitudinally traversible by hand. For series production of bores an index device for intermittent adjustment of the table according to adjustable stops may be provided. The range of transverse adjustment is 2" (50 mm).

A work fixture, designed expressly to meet the requirements of motor-car and lorry engine repair and reconditioning shops, is available to order, as an extra. It permits rapid and secure clamping of all kinds of cylinder blocks.

Adjustable control unit developed by Danly for greater press operating efficiency

A new, completely flexible method for positioning the run and stop buttons of



Your automatic screw machines are "No Better than their Tools"

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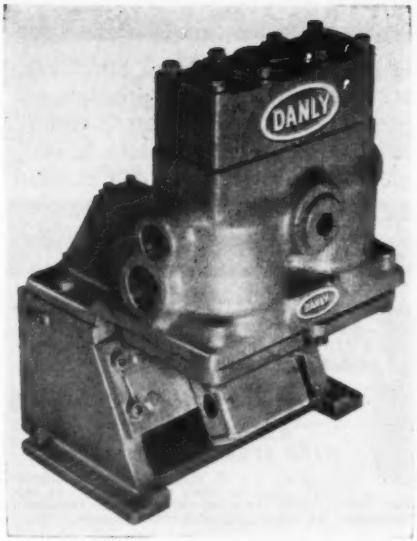
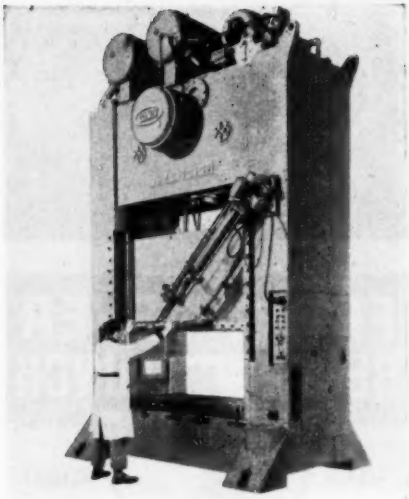
TAP HOLE-DER

- **Eliminate downtime** for cutting off taps—revolutionary through hole design permits use of full length tap.
- **Save time** removing broken taps—simply knock the shank out through the back of the holder.
- **Save taps** for reuse—description is never ground off with the shank. Taps are always identifiable for reuse.

Write for full details.

AMERICAN CAM COMPANY, Inc., Hartford 1, Conn.





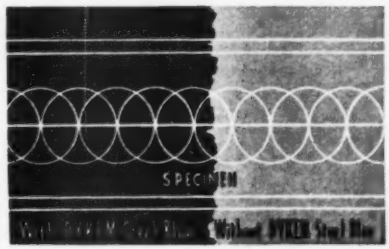
a press—a push button control bar suspended by a universally adjustable telescoping arm — has been developed by Danly Machine Specialties, Inc., Dept. MB, 2100 S. Laramie Ave., Chicago 50, Ill., builders of a complete line of mechanical presses.

With each change of dies or operating procedure, it is said this new Danly adjustable control bar can be relocated to conserve motion and time, thus increasing the operator's efficiency, comfort and safety. When changing dies, the arm can be swung completely clear of the working area without blocking aisle space.

The unit becomes a part of the press and does not occupy floor space. The height and position of the buttons are easily and quickly adjustable. The major movements are made with worm gearing, turned from hand wheels near the control buttons. Finger grips above the run buttons allow the press operator to relax his arms during operation. The run buttons are spaced widely enough to require two-handed operation at all times for maximum safety.

The adjustable press control unit is available with Danly presses but may be purchased for use on any press.

The new Danly dual air valve, also recently announced, is designed specifically to eliminate one of the hazards of mechanical press operation — accidental



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Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

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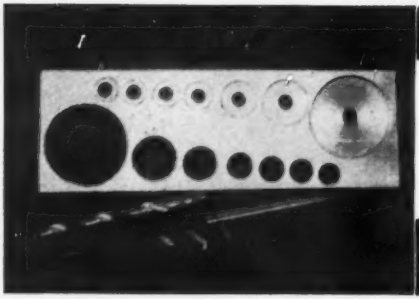

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Add the capacity to machine KING SIZE HOLES . . . from a dime to a dollar . . . with simple tools. Attach a MECK SPEED SELECTOR. This compound drive is now available for all 14" to 16" drill presses.

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HAND OPERATED

WEIGHT 70 POUNDS

Capacity 7/16" hole through 1/4" steel or equal.

65 sizes of round, square, flat, and oval punches and dies are carried in stock to fit this punch.

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It's here . . . A Willison designed dovetail straight edge to reach dovetail ways on machine tools. Lighter in weight—less upkeep required—neutralizes the effect of temperature changes.

ONLY DOVETAIL of this DESIGN

Vertical ribs and built in suspension pads, combined with a fine close grain cast iron. Double normalized and accurately hand scraped. Take the guess work out of machine alignment and let it go to work for you.

Patent Pending

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3-4-6 or 9 SPEEDS AT THE TWIST OF A WRIST!

MAKE OLD MACHINE TOOLS MORE PRODUCTIVE . . .

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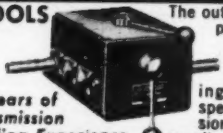

20 Years of Transmission Building Experience

The outstanding quality and simplicity of design of Turner Transmissions is the result of over 20 years of experience in the designing and building of multi-speed sliding gear transmissions. Custom ratios can be supplied for specific applications

TURNER UNI-DRIVE COMPANY
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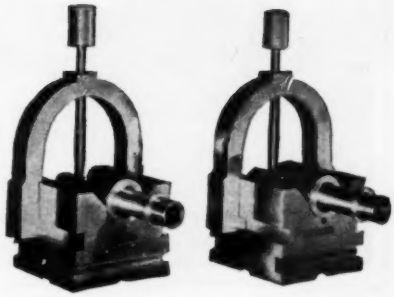
stroking due to valve failure. This valve consists of two independent pilot operated valves. The pilot valves are actuated by electromagnets and the main valves by air. Pilot valve construction appreciably reduces inrush and holding current requirements. The two independent valves are built into a single unit and cross ported in such a way as to provide maximum safety.

The Danly valve can be installed on a press with a pressure switch so that should either side of the valve fail to function, the resulting drop in pressure in the air supply tank will break the control circuits and prevent further press operation until the trouble is corrected.

V-block matched pairs concentric; nest up to 4¼"; key slot parallel within .0003"

Uni-V-Blocks, developed especially for accurate dimensional control, are announced by Precision Tool & Mfg. Co., 1305-B S. Laramie Ave., Cicero 50, Ill.

Matched pairs are claimed to be square, parallel and concentric to an extreme degree of accuracy. Key slot in base is located on center and parallel to the



V within .0003". Block is grooved front and rear for easy clamping on a machine table and layout plates.

Measuring 4 3/16" x 5 ⅛" x 5¾", the Model 5000 blocks will nest up to 4¼" diameter in V. Made of forged chrome-moly alloy steel, they are heat treated and drawn to obtain a hardness of 58 to 60 Rockwell, C scale. They are subjected to a closely controlled metallurgical phase stabilization process, used for attaining a dimensionally stable condition in the block.

The firm also features toolmakers bench

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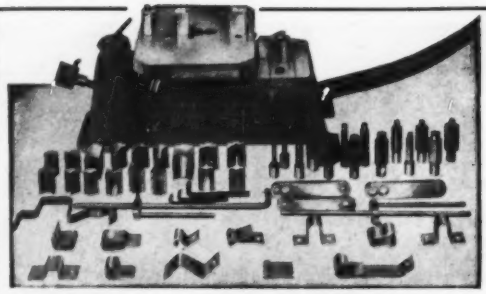

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CUTS, BENDS, PUNCHES

Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend and cut round or flat brass, bronze, aluminum, steel, etc., up to ½" x 1½" as illustrated, other models up to ¼" x 4".

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Nothing compares with it for fast and accurate layout and inspection.

A precision built, satin chrome finished height gauge with direct capacities from zero at base to 3" in thousandths. It scribes, it measures center distances, makes fast and accurate inspections. Add our new 3" hardened, ground and lapped standard riser to extend range to 6". Write for prices.

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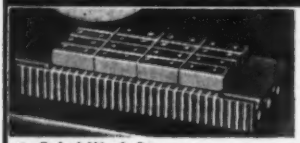

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Save Your Magnetic Chucks
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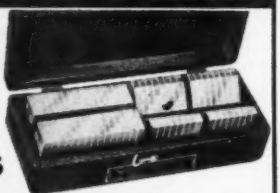
Eliminate Holding Devices



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- Hold Round Pieces

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SPECIFICATIONS:
Open width 7/8" to 6"
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Lengths to 120"

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parallel clamps, rugged shop clamps that are used for holding pieces ⅝" to 9½" with a throat depth up to 5". They are case hardened and Mar-Tempered for wear and solidity. Clamping action is said to be straight and smooth.

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To meet the demand for surface plates on a lower price basis, Microflat Co., Dept. M, 2326 E. 8th St., Los Angeles 21, Calif., has just brought out a new line of gray granite to supplement its line of premium black granite. The same accu-

racies prevail for the gray granite but it is more economical. The gray granite sizes range from 12" x 18" to 48" x 72" in 2 and 4-clamp edge types. Surface accuracies are finished down to .00005 inch.

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With the AMIC "Quick-Action" Vernier Caliper

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Size 6" No. 21B, Graduation 1/40", vernier reading .001.
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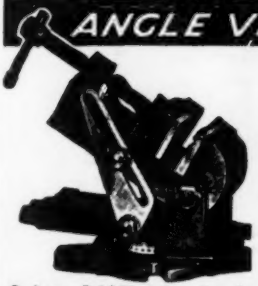

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Special trim saw for aluminum press-formed parts

The Oliver Machinery Co., Dept. MB, Grand Rapids 2, Mich., is offering a special trim saw for aluminum press-formed parts.

When press forming aluminum and thin steel parts there is frequently a wrinkled edge of stressed material around the outside which requires trimming. This can be cut very quickly, it is claimed, on the No. 116-T trim saw by placing the work on top of the Micarta guide pin which acts as a supporting point. The ample clearance around this point permits unrestricted angling and turning of the material during the cutting and trimming operation. A fine tooth blade operated by the five h.p., 900 r.p.m. motor will produce a rapid and clean cut. For cutting of sheet metal or stainless steel a five h.p., 900 r.p.m. motor is recommended. The machine can also be equipped with a variable speed motor drive up to a 6:1 ratio with maximum speed variation from 1200 to 200 r.p.m.

Many machines of this design, sometimes referred to as a horn type band saw, have been used extensively in the aircraft industry.

Heavy duty, magnetic base precision test indicator holder with 125 lb. pull

Designated as "Tiny-Titan" No. 150, a new, powerful, heavy duty Duplex magnetic base holder has just been announced by Enco Mfg. Co., Dept. B, 4520-26 West Fullerton Ave., Chicago 39, Ill., which instantly mounts test indicators up to 3" in diameter to flat or down to ¾" round with the extraordinary pull of 125 lbs.

Features include: (a) Non-breakable, green tenite plastic case 1¼" wide, 4" long and 1⅝" high, having vertical ribs

W.H.O.* SAYS:

"Don't have FITS over FASTENERS, have fasteners that fit."

For the finest in milled-from-the-bar cap screws, set screws, coupling bolts and milled studs

DON'T GET STUCK, STICK TO THE ONES MADE BY

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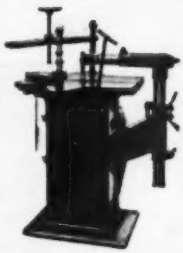

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Faster and more economical cutting of keyways with SUNRAY. Meets your most exacting requirements. Keyways cut ⅛" to 1" by broach having several teeth cutting at once; also eliminates tendency of cutter to dig into the work. Many other advantages!

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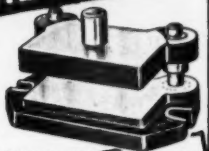

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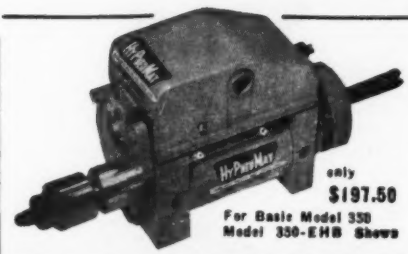

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to permit deftness of manipulation—steel parallel chamfered bars 2½" x ¼" x ¼" running lengthwise along the bottom of the unit provide the magnetic contact surface; (b) Ball swivel of brass, and stem of non-magnetic material, which isolates the magnet from the indicator. A knurled locknut serves to secure quickly and firmly the post position; (c) Knurled jack-type release and positioning screw that is simple, yet foolproof—complete release or minute changing of position may be accomplished without jarring; (d) 3-step universal rod 6" in length with diameter sizes 7/32", ¼" and 5/16" for taking all indicators. Threaded joints are eliminated; (e) Offset clamp for lug back indicators; (f) Swivel adaptor which allows full 360° adjustment in all directions; (g) Adaptor for attaching 5/32" stud type indicators.

Drilling machine provides spindle speeds up to 12,000 r.p.m.

The Avey Drilling Machine Co., Dept. B, Cincinnati 1, Ohio, has announced the No. 1 Super Sensitive machine having capacities from small number size drills up to No. 1 Morse taper drills.

The machine is driven by standard ¾ or 1 hp 1200, 1800, or 3600 r.p.m. motors through vee belt drive. Speeds are

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Name Plate Stamping Machine in several models—HAND—FOOT AND POWER Operated.

For parts stamping and a variety of lettering and numbering jobs.

Write to the "ORIGINAL MARKING SPECIALISTS" for complete information upon a wide range of marking equipment.

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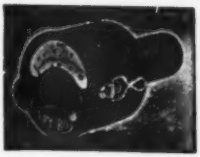

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Two Sizes

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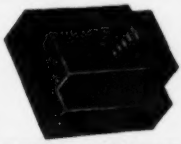

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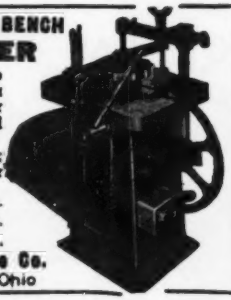

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3¼" stroke; adaptable for other work.
Low first cost—prompt delivery.
Good dealers wanted.
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VERNIER CALIPER
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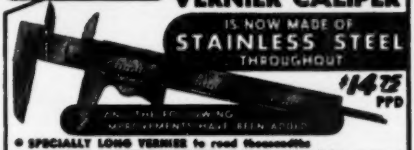

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- 2 GRADUATIONS - 1/1000" - 1/128" - 1/10 mm in back

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280-MT Lafayette St., NY 12

changed from in front of machine by a rack and pinion operated motor plate, which provides adjustment for vee belt tension.

Three speed ranges are available: 1000 through 12,000, 500 through 6000, and 330 through 4000.

Relief valve eliminates chattering

A recent addition to the line of heating equipment sold by the Eclipse Fuel Eng. Co., Dept. BB, Rockford, Ill., is a new piston-type, oil relief valve for regulating pressure on the company's new series "CF" closed flame gas-oil burners.

This new valve, according to Eclipse, does away with objectionable chattering and pulsation. A cylindrical steel piston closes the port with a quick, positive shearing action, which eliminates the pounding noise commonly caused by valves with disc seats.

Five different spring sizes permit a wide range of pressures from 0 to 500 pounds. The valve piston and spring are easily removed for field servicing without dismantling the entire valve. These relief valves are available in four sizes from ⅜" port to 1" port.

Test indicator has two working ends

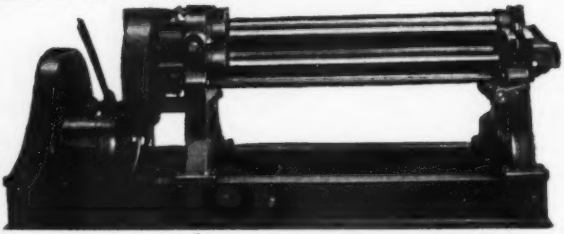
The Koch test indicator, Andrew Genales, 28 Second Ave., Nyack, N.Y., has two working ends, one end to test outside surfaces, the other, inside.

Since the indicator has both a torsion spring and a compression spring, positive and sustained accuracy is claimed. Each graduation on the scale represents 1/1000" movement of the plunger. The indicator is so designed that the plunger moves away from instead of against the lever, preventing breakage of the delicate parts by a sudden or excessive jolt of the plunger.

The Koch test indicator can be obtained with a set of attachments which adapt it for inspection work on a surface plate, setting up work on milling machines, jig borer and testing flat surfaces where surface gages are frequently used.

Beloit

INITIAL TYPE
BENDING ROLLS



Sheets and plates are quickly formed into cylindrical shapes with this efficient, hard working Beloit Bending Roll. Built for years of trouble-free service. Easy to operate. Rolls are of slip type. Hinged housings permit speedy removal of completed cylinders. Reversing lever places machine in readiness for the next job. Do forming quicker easier and at lower cost with Beloit equipment.

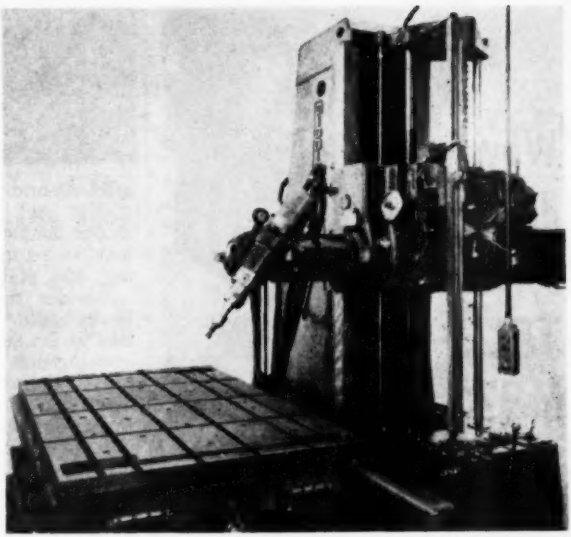
Picture is one member of the famous Beloit line which also includes Punches, Shears, Rod Cutters, Notchers, Bending and Straightening Rolls.

Write for complete details

HENDLEY & WHITTEMORE CO.
100 Blackhawk Blvd. Beloit, Wis.

New Giddings & Lewis high speed attachment simplifies difficult milling operations

A new type, high speed milling attachment, designed to machine aluminum alloy forgings for airplane wing hinge sections, has been announced by the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. This full swivel hydro-drive milling attachment, which was built for Grumman Aircraft Eng. Corp., Long Island, New York, to be used on a G & L table type horizontal boring, drilling and milling machine, is said to be exceptionally well adapted for machining the many varying angles necessary on wing hinges.



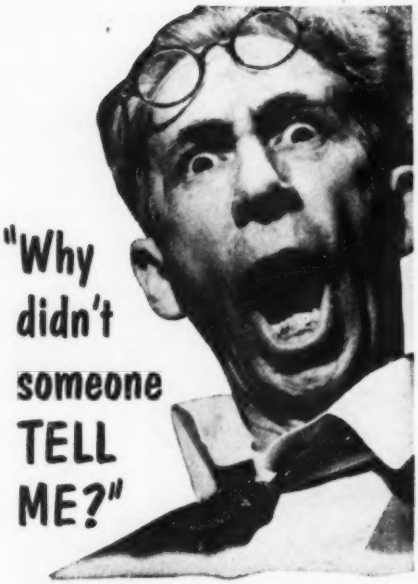
Independently driven, this attachment has no connection with the machine spindle and therefore does not depend upon any high inertia driving elements in the headstock of the machine. The headstock acts only as a carrier for moving the attachment up and down. The attachment has a speed range of 3:1 and a spindle speed range from 800 to 2400 r.p.m. for high speed machining of non-ferrous metals.

Radius dresser

Manufactured by Sperman Metal Specialties, Dept. MB, 2199 E. 21st St., Brooklyn 29, N. Y., the Mighty Midget radius dresser is said to shape and dress all grinding wheels to any desired radius up to 1½" concave or convex. It is not necessary to remove the grinding wheel guard, since the wheel is dressed from below, an added safety feature.

The shaft of the dresser is of hardened and ground steel, turning inside a cast iron bearing that is capable of precision adjustment for wear and tension. The locking device for the diamond allows freedom in adjusting the height, yet it tightens rigidly without the chance of getting the diamond out of adjustment. Some methods, such as using a setscrew against the diamond, can move the diamond out of adjustment as much as .010 or more. The unit also has adjustable, accurate position stops.

A companion tool to the radius dresser is the Mighty Midget angle dresser for dressing angles on grinding wheels. It is operated by a convenient handle that keeps the mechanic's hand away from the wheel. The angle can be accurately set with a protractor from any of the ground sides or base, or it can be set with a sine bar for special work.



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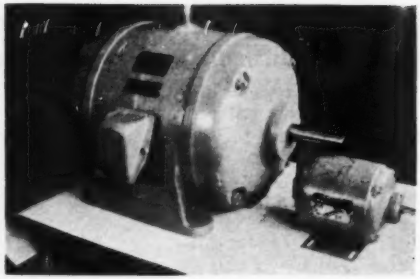
SMITH WELDING EQUIPMENT CORPORATION

Dept. MTBB-61, 2635 S.E. 4th St., Minneapolis, Minn.

New type a.c. brake motor installed in place of standard motors

An entirely new type of brake motor has recently been developed by Samuel Noodleman, general manager of the Standard Electric Division, Standard Dayton Corp., Dept. BB, Box 1001, Dayton 1, Ohio.

This motor is said to provide low cost braking action in an a.c. squirrel cage motor without wear, and with quiet



split-second performance. It represents a low cost, packaged type, a.c. brake motor that can be installed in place of a standard motor to provide both braking and standard motor performance.

Besides these characteristics this brake motor has some inherent properties which suit it for applications where braking has not been economically practical heretofore. For example, any machine on which both ends of the rotor shaft are utilized for driving purposes, such as pedestal grinders, can be provided with rapid stopping for safety purposes. Similarly, in the shell type shaftless rotor applications, where stator and rotor are built in as parts of the machine and the rotor shaft is not available for standard brakes, a shell type brake motor can be readily installed. In this instance the motors can be designed with brake windings and still meet the physical dimensions specified by NEMA MG1-7.216.

Rockwell introduces new electric counter

A new electric counter similar in design to its manually-operated 82-A counter has been introduced by Rockwell Mfg. Co., Dept. BB, Register Div., 400 N. Lexington Ave., Pittsburgh 8, Pa.

A double counter, the new device offers an upper set of figures recording counts up to 999 and a lower set recording counts up to 99,999. A total registered by the upper set may be returned to zero at any time—at the end of a shift or run or on completion of a count, for example—while the lower set continues to record a grand total. A bell rings at each count.

Sid Tool Company

WHY WAIT FOR SPECIAL TAPS?

. . . Has them IN STOCK for IMMEDIATE DELIVERY!

HIGH SPEED SPECIAL RIGHT HAND TAPS

SIZE	THREAD
4	32-48-50-64
5	30-32-36-48-80
6	36-40-48-56-60
7	32-40
8	24-30-36-38-40-44-48
9	24-28-32-40
10	28-30-36-40-48-64
12	20-28-32-36
14	20-24-28
1/16	60-64
5/64	72
3/32	48
7/64	48-56
1/8	32-40
5/32	32-36-40
9/64	36-40
11/64	36
3/16	20-24-32
13/64	32
7/32	24-28-32
1/4	18-24-26-27-30-32-36-40
5/16	16-20-22-27-28-32-40

SIZE	THREAD
3/8	12-16-18-20-27-28-32-36-40-48
7/16	12-16-18-22-24-27-28-30-32-36-40
1/2	12-14-16-18-22-24-26-27-28-36-32-40
9/16	16-20-24-27-28-30-32-40-48
5/8	12-14-16-20-24-27-28-32-36-40
11/16	11-16-18-20-24-27-28-30-32
3/4	9-11-12-14-18-20-24-26-27-28-32
13/16	10-14-18-20-32
7/8	10-12-16-18-20-24-27-28-32
15/16	8-9-10-12-14-16-18-20-24-32
1	10-12-16-18-20-24-27-32-40
1-1/16	12-14-16-18-20-24
1-1/8	8-10-14-16-18-20-24-32
1-3/16	8-10-12-14-16-18-20-24
1-1/4	8-10-14-16-18-20-24-32
1-5/16	12-14-16-18-20-24-32
1-3/8	8-10-14-16-18-20-24
1-7/16	8-10-12-16-18-20-24
1-1/2	8-10-14-16-18-20-24-28
1-9/16	18-20-24
1-5/8	5½-8-10-12-13-16-18-20-24
1-11/16	10-12-14-16-18-20-24

SIZE	THREAD
1-3/4	8-10-12-14-16-18-20-24
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20-24
1-15/16	8-10-12-14-16-18-20-24-28
2	4-½-8-10-12-16-18-20
2-1/16	12-14
2-1/8	12-16-20
2-3/16	12-16
2-1/4	4-½-8-12-14-16-18
2-5/16	12-18
2-3/8	12-16-18
2-1/2	8-10-12
2-9/16	18
2-5/8	12-16-20
2-3/4	16
2-7/8	8-12-16
3	8-16
3-1/4	8-12-16
3-1/2	8-12-16
3-7/8	6
4	8-12

HIGH SPEED LEFT HAND TAPS

SIZE	THREAD
0	80
1	56-64-72
2	56-64
3	56
4	32-36-40-48
5	40-44
6	32-36-40
8	32-36-40
10	24-30-32-40
12	24-28-32
1/4	20-28-32
5/16	18-20-24-28-32

SIZE	THREAD
3/8	16-24-32
7/16	14-20-28
1/2	12-13-20-28
9/16	12-18-20-24
5/8	11-12-18-20-24
11/16	11-16-24
3/4	10-16-18-20
13/16	16
7/8	9-12-14-18-20
1	8-12-14-16-18-20
1-1/8	7-12
1-1/4	7-12-16-18

SIZE	THREAD
1-3/8	6-8-10-12-16-18-20-24
1-7/16	8-10-12-14-16-18-20
1-1/2	6-8-10-12-16-18-20
1-9/16	8-10-12-16-18-20
1-5/8	8-10-12-14-16-18-20
1-11/16	8-10-12-14-16-18-20
1-3/4	8-10-12-14-16-18-20
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20
1-15/16	8-10-12-14-16-18-20
2	4½-10-12

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NOTE: Oversize — Undersize — Metric — 64th and 32nd Size Taps Available for Quick Delivery.

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Coil handler developed by Dixon

Dixon Automatic Tool, Inc., Dept. BB, 2304 23rd Ave., Rockford, Ill., recently announced a new 15,000 lb. capacity coil handler for lifting and turning coils up to 48 inches wide.

The Dixon coil handler was designed to pick up, turn, transport or stack large, heavy coils. It is mainly used for picking up coils set either horizontal or vertical, and if desired, will turn the coil 90° as the crane lifts.

After the unit is placed on the coil, the pressure shoe is adjusted to the coil radial thickness. The pressure shoe has a floating action to allow full bearing on the outer diameter of the coil. A concave surface on the shoe allows maximum clamping surface. Ten lineal feet of ¼" chain is provided as standard equipment. When coils are stacked several tiers high, the chain length allows the operator to release the pressure shoe from the floor.

The inner support arm has a contour surface 4½ in. wide, the full length of the arm. This distributes the load over a greater area to eliminate handling marks on even the heaviest coils.

A bale is located for straight lift with horizontal axis to coil. A second bale is for turning the coil 90° from either the vertical or horizontal. The third bale is for straight lift with vertical axis to coil.

Minimum width capacity is 24" up to a maximum of 48". Minimum inside dia. to outside dia. is 10" and ranges up to a maximum of 16". The weight of the Dixon coil handler is 500 lbs. A safety factor of five is maintained throughout.

E. H. Jones No. 55 vertical milling machine

British Industries Corp., Dept. BB, 164 Duane Street, New York 13, N.Y., announces a new vertical milling machine available for immediate delivery, manufactured by the E. H. Jones Machine Tool organization in England.

This machine is designed for high speed milling and die sinking, and the headstock can be swivelled 90° in either direction through a worm and worm wheel arrangement. This device is said to enable the head to be set very accurately and swiftly to any desired angle, and can be re-set to zero extremely rapidly. The machine has a working surface of 32" x 11", and comes equipped with standard ¾ h.p. motor with 8 speeds 125 to 2960 r.p.m. It has a ⅝" collet capacity.

WESTERN TOOL SUPPLY COMPANY

SPECIAL TAPS in STOCK . . . for IMMEDIATE DELIVERY

HIGH SPEED SPECIAL RIGHT HAND TAPS

SIZE	THREAD
4	32-48-60-64
5	30-32-36-48-60
6	36-40-48-56-60
7	32-40
8	24-30-36-38-40-44-48
9	24-28-32-40
10	28-30-36-40-48-64
12	20-28-32-36
14	20-24-28
1/16	56-64
5/64	72
3/32	48
7/64	48-56
1/8	32-40
5/32	32-36-40
9/64	36-40
11/64	36
3/16	20-24-32
13/64	32
7/32	24-28-32
1/4	18-24-26-27-30-32-36-40
5/16	16-20-22-27-28-32-40
3/8	12-16-18-20-27-28-32-36-40-48
7/16	12-16-18-22-24-27-28-30-32-36-40
1/2	12-14-16-18-22-24-26-27-28-30-32-40
9/16	16-20-24-27-28-30-32-40-48
5/8	12-14-16-20-24-27-28-32-36-40
11/16	11-16-18-20-24-27-28-30-32
3/4	9-11-12-14-18-20-24-26-27-28-32
13/16	10-14-18-20-32
7/8	10-12-16-18-20-24-27-28-32
15/16	8-9-10-12-14-16-18-20-24-32
1	10-12-16-18-20-24-27-32-40
1-1/16	12-14-16-18-20-24
1-1/8	8-10-14-16-18-20-24-32
1-3/16	8-10-12-14-16-18-20-24
1-1/4	8-10-14-16-18-20-24-32
1-5/16	12-14-16-18-20-24-32
1-3/8	8-10-14-16-18-20-24
1-7/16	8-10-12-16-18-20-24
1-1/2	8-10-14-16-18-20-24-28
1-9/16	18-20-24
1-5/8	5½-8-10-12-13-16-18-20-24
1-11/16	10-12-14-16-18-20-24
1-3/4	8-10-12-14-16-18-20-24
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20-24
1-15/16	8-10-12-14-16-18-20-24-28
2	4-½-8-10-12-16-18-20
2-1/16	12-14
2-1/8	12-16-20
2-3/16	12-16
2-1/4	4-½-8-12-14-16-18
2-5/16	12-18
2-3/8	12-16-18
2-1/2	8-10-12
2-9/16	18
2-5/8	12-16-20
2-3/4	16
2-7/8	8-12-16
3	8-16
3-1/4	8-12-16
3-1/2	8-12-16
3-7/8	6
4	8-12

HIGH SPEED LEFT HAND TAPS

SIZE	THREAD
0	80
1	56-64-72
2	56-64
3	56
4	32-36-40-48
5	40-44
6	32-36-40
8	32-36-40
10	24-30-32-40
12	24-28-32
1/4	20-28-32
5/16	18-20-24-28-32
3/8	16-24-32
7/16	14-20-28
1/2	12-13-20-28
9/16	12-18-20-24
5/8	11-12-18-20-24
11/16	11-16-24
3/4	10-16-18-20
13/16	16
7/8	9-12-14-18-20
1	8-12-14-16-18-20
1-1/8	7-12
1-1/4	7-12-18-18
1-3/8	6-8-10-12-16-18-20-24
1-7/16	8-10-12-14-16-18-20
1-1/2	6-8-10-12-16-18-20
1-9/16	8-10-12-16-18-20
1-5/8	8-10-12-14-16-18-20
1-11/16	8-10-12-14-16-18-20
1-3/4	8-10-12-14-16-18-20
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-11-16-18-20
1-15/16	8-10-12-14-16-18-20
2	4½-10-12

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NOTE: Oversize taps. Special size reamers. H.S. extension drills. H.S. Taper length drills No. 1 to No. 60—Letter sizes A. to Z. Fractional sizes 1/8" to ½" 12" Overall 9" flute length. H.S.S.S. aircraft drills 6" and 12" long.

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MAGNI-FOCUSER

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SIZES: 20" focal lgth. 1½ power – 14" focal lgth., 1¾ power, 10" focal lgth., 2¼ power; 8" focal lgth., 2½ power . . . . . price each ONLY 10.50

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SIZE: 60" high 27" wide 29" base

Use this Press in the Shop or take it with you on the job. Frame is 4" welded channel iron. Has 4½" stroke, 2½" diam. ram. Valve operates piston in both directions. Adjustable platform. Positive power Hand Pump with handle. 2000 PSI pressure gauge. 129.00

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SPECIAL

Gives 20,000 lb. thrust using 1500 PSI line pressure as obtained from our hydraulic pumps. Will produce up to 40,000 lb. thrust with 3000 PSI. Can also be used on a low pressure air system. Has 4" bore; 18" stroke; 30½" long. Ideal for shop. USED 29.95

Part No. 29 NEW 43.95

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Operating pressure 1500 PSI. Cap., 1.5 cu. in per complete cycle . . . 12.75

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Improved resinoid, hub-type, reinforced cut-off wheels

Norton Co., Dept. B, Worcester 6, Mass., announces an improved reinforced, resinoid, hub-type cut-off wheel. Known as the BFR, this wheel replaces one with the same designation which has been on the market.

Longer life is said to be the main feature of the improved wheel. Tests show that increased life of up to a third more than the former wheel can be expected with the same quality of cut. These more durable wheels also tend toward a better uniformity in grinding action wheel to wheel and lot to lot, showing no tendency to fray or split at the face in layers.

This wheel is available in the following specifications: Abrasive type—Alundum—16, 24, 36, and 54 grit; Crystolon—16, 24, and 36 grit; diameters—7" and 9"; thicknesses—⅛", 3/16", ¼", ⅜"; hole size—⅞"; grade—K; marking—KBFR—X27.

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One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed-Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

Patents Pending

SLEEVES MADE IN THE FOLLOWING SIZES:
3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

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Cut costs of Removing Broken Taps

Universally used for removing stubborn, balky taps that break off deep in threaded work. Quick, easy, inexpensive. Will not damage threads. In 2, 3 and 4 flute styles—sizes No. 4 to 1½".

WALTON-AMERICAN TOOL HOLDERS
Save Time and Labor on Tool Changes.

Many holders in one. Head will swivel around an entire circle. May be set for straight, right or left hand offset positions. Will hold with perfect grip any size square or round tool bit or boring bar from ⅛" to 7/16".

"*REPS" PIPE & STUD EXTRACTORS
Reduce Labor Costs For Removing Pipes, Studs and Screws.

For removing broken pipes or studs that defy movement. "Reps" makes a strong four point grip without hammering or pounding. Hardened steel. Pulls rather than reams. In sizes, for every pipe from ⅛" to 2", every stud and screw from ⅜" to 3½".

(*Reps. Tool Company, Inc., a Walton affiliate.)

Sold by leading dealers, or write direct for catalog No. 10 of Walton Tools and details of 30 day free trial offer.

THE WALTON COMPANY, Hartford 10, Conn.

High-capacity thrust roller bearing

A new application of single acting thrust roller bearings for use on railway transfer bridges and other high-capacity industrial loadings has just been introduced by Rollway Bearing Co., Inc., a subsidiary of Lipe-Rollway Corp., Dept. B, 543 Seymour St., Syracuse, N. Y.

One of these new bearings, type T-21906, supports a vertical thrust load of 380,000 pounds at 16 rpm and has a rated capacity of 700,000 pounds.

In this instance, the T-21906 roller bearing differs from most applications of single-acting thrust bearings. No center shaft is used to locate the bearing's roller assembly. Instead, a locating ring, which is roll pinned securely to the stationary plate, maintains the roller assembly in alignment.

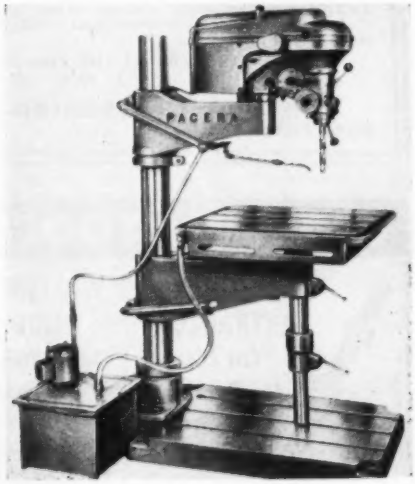
Locating ring and stationary plate make up the stationary plate assembly, which is ground on its outside diameter to be a slip fit in the housing of the machine to which it is applied.

The T-21906 bearing has additional application advantages. Besides being especially suitable for installations where space is limited, it also can be used on horizontal shaft applications to overcome the common problem of maintaining a sufficient amount of lubricant in the bore of the roller assembly. With the new thrust bearing, oil reaches and remains between the locating ring and the roller assembly, a condition not always evident in standard thrust bearings. This roller bearing is 25¾" outside diameter, 17" inside diameter and 3¾" thick.

Drill press does work of radial

The Pacera articulated head drilling machine has been produced to meet the requirements for an inexpensive machine capable of handling large work, according to the distributor, United Mach. Sales, Dept. MB, 2351 N. St. Louis Ave., Chicago 47, Ill. Experience has shown that in many instances an expensive radial drill is used to drill small holes simply because the work is too large to be accommodated on a normal drilling machine.

A solidly built machine, on a 4½" solid steel column, the Pacera is fully stressed at its stated capacity. It has a 24" throat capacity and a 24" x 24" rotating worktable. To ensure adequate rigidity for heavy work, the revolving worktable is supported by a telescopic jack, but if necessary the table may be swung right around the column, allowing work to be carried on the base. Capacity is ⅞";



speeds are available at 80/4000 rpm, in addition to low spindle speeds for tapping, counterboring and spot facing.

The design of the Pacera is such that the drill point may easily be brought over any point on the table. The head and its supporting arm are carried in ball thrust races, and the table also revolves on a ball thrust race. The head carries a dual locking device and may be locked in any position; it is available in either eight or ten speeds. Both types employ a totally enclosed oil immersed gear box with external gear change lever giving high and low speed settings on four and five-step cone pulleys.

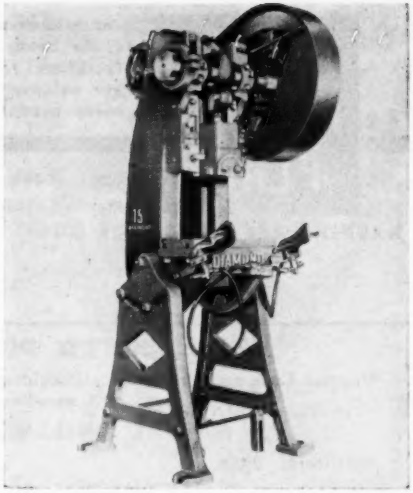
Hand operated turret press; 15 ton punch press

The Diamond Machine Tool Co., Dept. B, 5111 Coffman-Pico Rd., Pico (Los Angeles), Calif., announces a redesigned and improved hand operated turret punch press that has a punch indexing control for automatic exact positioning of die sets and a redesigned 15 ton open back inclinable punch press with shut die height of nine inches.

Continuous or single stroke operation is available in the o.b.i. press that is said to meet rigid safety standards. A metal guard completely covers the flywheel. The frame is of meehanite casting, properly aged under natural conditions, and

designed to rigid specifications of strain gage analysis with radii in proper locations to distribute stress concentrations. The casting has a large safety factor. Standard stroke is 2″ with strokes available upon order up to 4″. Bed area is 8″ x 15⅜″ and the total length of gibs is 11¾″. The press is made in plain open belt with 125 strokes per minute and back geared with 70 strokes per minute. Motor recommended is 1½ h.p.

With the hand operated turret press, punches and dies are geared together for permanent precision alignment and lock rigidly in punch position. The turret has a 13″ throat and contains 12 punches and dies that are interchangeable between turret positions. Turrets are geared to-

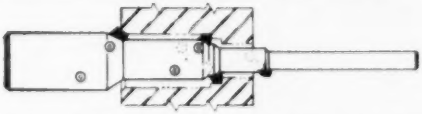


gether with self-compensating gears to eliminate backlash. The interior is lighted to permit easy spotting of pilot holes or center punch marks. The capacity is 10 tons and the maximum punch size is 1½″ with ⅛″ mild steel. The punch diameter is 3/16″ in ¼″ steel. The ram is actuated by a generated cam which delivers a variable ram pressure.

Carbide bits for boring bars through use of new type quill

Solid triangular tool bits of carbide, hss, tantung or stellite can be adapted to special multi-stage boring bars by inserting a new quill, announced by Everede Tool Co., Dept. B, 2000 N. Parkside Ave., Chicago 39, Ill.

Quills are available in a wide range of sizes, diameters and lengths and are



easily inserted into boring bars. The V-shaped nest for the triangular tool bit eliminates side-creep. Back-up is prevented by back-up and adjusting screw supplied with the quill. Precision relocation of tool bits after sharpening is simplified because the V-shaped tool bit nesting automatically provides distance between multiple tool bits when they are set to bore the correct diameter.

The MARKET PLACE

Advertisements acceptable in THE MARKET PLACE include those for employment, sales services, production facilities, representation and related needs. Rates: $12 per column inch per insertion. Maximum size advertisement accepted in this section is two inches.

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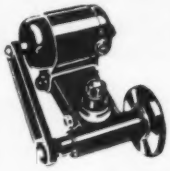

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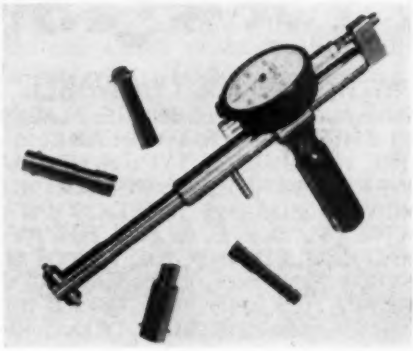
Gages feature interchangeable measuring heads

Rimat Tool Co., 25 W. Dayton St., Pasadena 2, Calif., announces the development of interchangeable gage heads as a feature of their dial bore gages. All standard gage heads for measuring "0" ring grooves, snap ring grooves, pitch diameters of internal threads, small bores and most special gage heads are now interchangeable on one gage body. This development makes it feasible to use precision checking equipment on development projects, short runs or contract work where formerly an expenditure for a complete gage was not justified.



Mechanics Through the Ages

AS EARLY AS 996 AD, **GERBERT** A BRILLIANT BENEDICTINE MONK (LATER TO BECOME POPE SYLVESTER II) CONSTRUCTED A CLOCK FOR THE **MAGDEBURG** CATHEDRAL, WHICH SOME WRITERS CLAIM, WAS THE FIRST MECHANICAL CLOCK EVER MADE!

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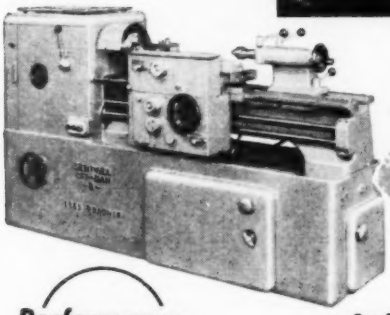

BIG SAVINGS

Performance Data

Material	Die cast aluminum
Thread produced	5/8"-18 UNF 2B internal
Thread length	3/8" full thread
Depth C'bore for thrd.	7/16"
RPM	2000
Number passes req'd	8
Type tool	Carbide
Approx. pcs per grind	7500
Cutting time	8 seconds
Floor to floor time	15 seconds

*name on request

with the CRI-DAN "B"

SINGLE POINT THREADING MACHINE

Again, the Cri-Dan Threading Machine proves its amazing efficiency.

This small aluminum casting, formerly threaded on a tapping machine, was set up on the Cri-Dan "B". The finished casting required a 5/8"-18 class 2B internal thread cut to within 1/16" of the shoulder. When the Cri-Dan "took over," the scrap loss due to concentricity was completely eliminated, thread depth was consistently maintained and overall production increased.

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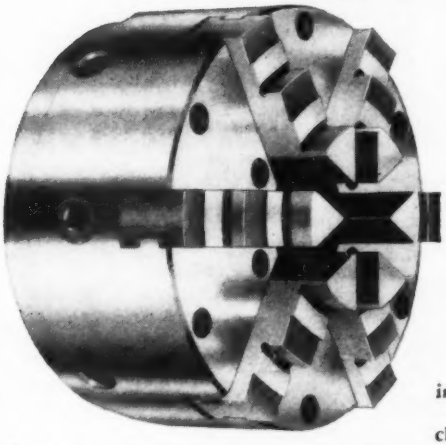

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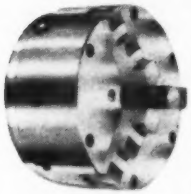

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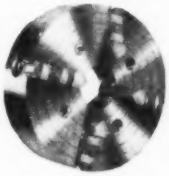

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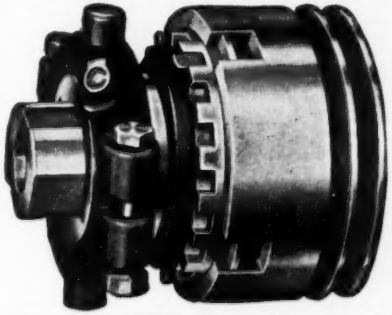

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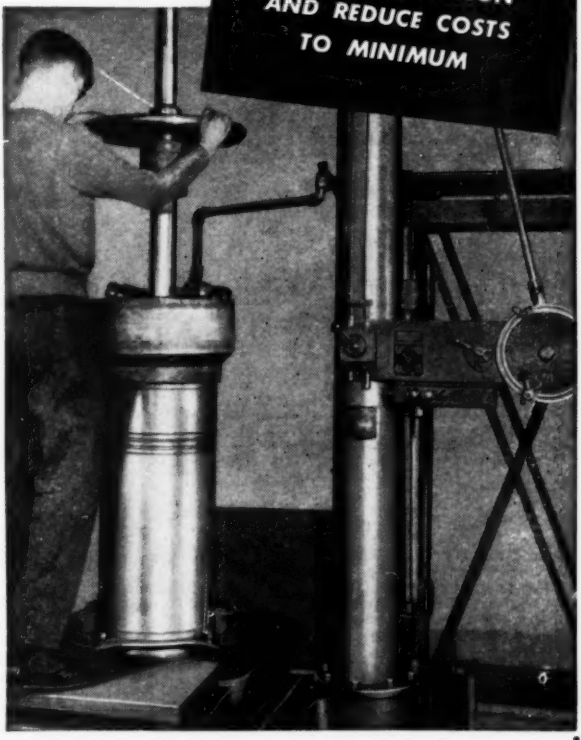

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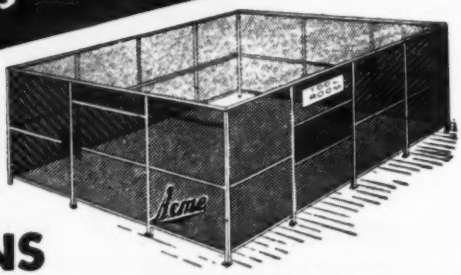

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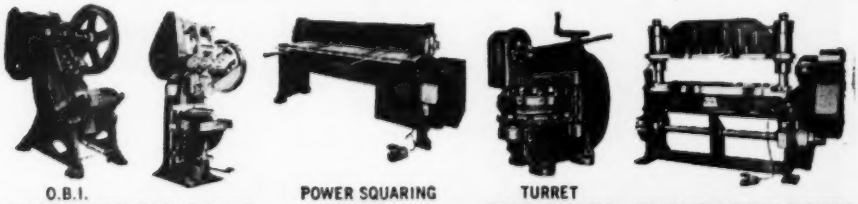

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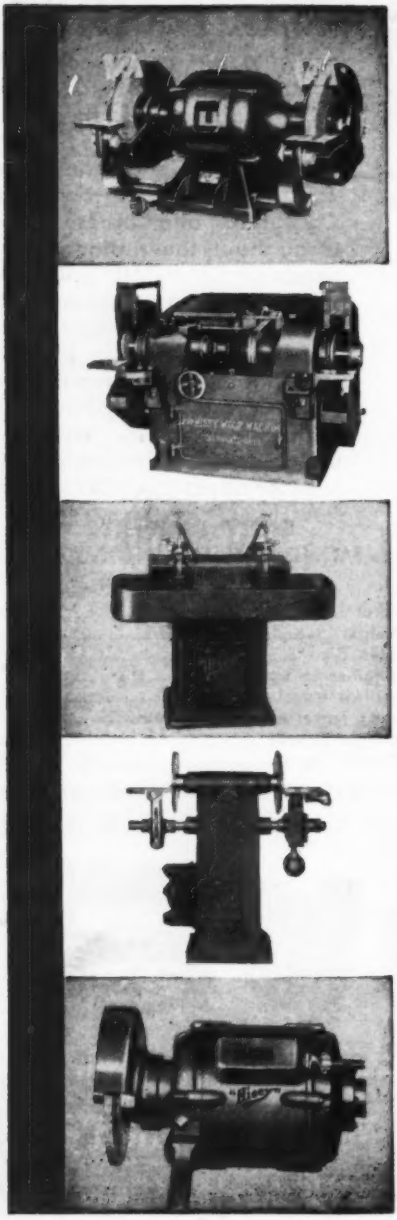

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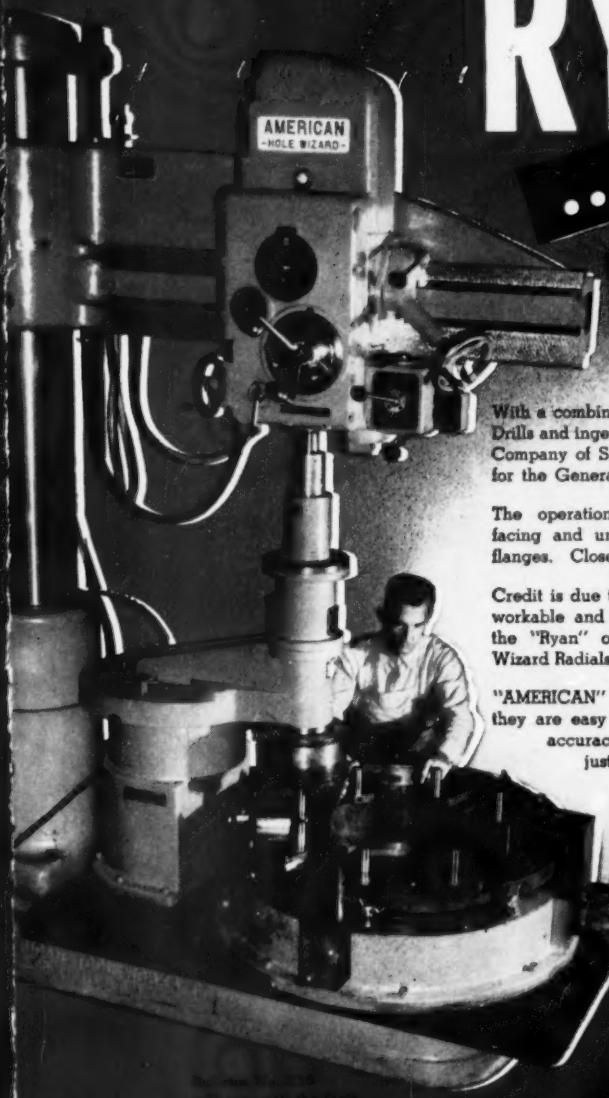

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